1998-2005 HVAC

Climate Control - 163 Chassis

GENERAL INFORMATION

GENERAL NOTES: PASSENGER CARS: CLIMATE CONTROL - AH83.00-Z-9999AZ

MODEL all

	Notes on retrofitting an air conditioning system	MODEL all	**AH83.30-P-0001-02A**
	Repair work for defective refrigerant circuit	MODEL all	AH83.30-P-1782-01A
	Instructions for installing actuator motors	MODEL 199,230.4	AH83.10-P-0001-01R
	Notes on EU type approval requirements	MODEL 170,209,211,220...	AH83.70-P-0001-09Q
	Notes on repairing stationary heater	MODEL 202 up to 31.5.97 retrofitted stationary heater	AH83.70-P-0001-03D
	Information on repairs to stationary heater	MODEL 202 as of 1.6.97, 208 Retrofitted Thermo Top C stationary heater	AH83.70-P-0001-03E
	Notes on repairing Telestart	MODEL 163, 168, 170, 202, 208, 210 ...	AH83.70-P-0003-02AA
	Notes on installation of stationary heater	MODEL 215 Retrofitted stationary feeling	AH83.70-P-0008-02N
	Notes on handling refrigerant R134a	MODEL all Air conditioning system with cold means R134a	**AH83.30-N-0003-01A**
	Notes on stationary ventilation with Telestart	MODEL 210.### 1# with Telestart T70 for un-networked heater	AH83.70-P-0009-01B
	Information on installing actuator motors	MODEL 211	AH83.10-P-0001-01T
	Information on installing actuator motors	MODEL 219.3	AH83.10-P-0001-01TX
	Notes on handling refrigerant R134a	MODEL 240	AH83.30-P-0003-01H
	Notes on handling refrigerant R134a	MODEL 199	AH83.30-P-0003-01SLR
	Notes on repairing the stationary heater	MODEL 163.###1# up to 31.8.01 Retrofitted Thermo Top C stationary heater	AH83.70-P-0001-03A
	Notes on repairing stationary heater	MODEL 168 Retrofitted Thermo Top C stationary heater	AH83.70-P-0001-03B
	Information on repairs to stationary heater	MODEL 170.435/445/447 up to 31.1.00 Retrofitted Thermo Top C stationary heater	AH83.70-P-0001-03C
			AH83.70-P-

Information on repairs to stationary heater	MODEL 170.444/449/465	0001-03CA
Information on repairs to stationary heater	MODEL 210...	AH83.70-P-0001-03F
Notes on repairing the stationary heater	MODEL 163.###1# as of 1.9.01 Retrofitted Thermo Top C stationary heater	AH83.70-P-0001-03I
Distinguishing features stationary heater/ stationary preheater/heater booster	MODEL 202.### 1# Webasto Thermo Top C heater	AH83.70-P-0003-01A
Distinguishing characteristics stationary heater/ stationary preheater/heater booster	MODEL 210.###1# up to 31.5.00 Heater Webasto Thermo Top C	AH83.70-P-0003-01B
Distinguishing features stationary heater/stationary preheater/heater booster	MODEL 168.###1# Heater Webasto Thermo Top C	AH83.70-P-0003-01C
Notes on repairing telestart	MODEL 168,170, 202 as of 1.6.97, 208,210 More retrofitted telestart T60	AH83.70-P-0003-02A
Notes on repairing telestart	MODEL 202 up to 31.5.97 Telestart T60 in retrofitted stationary heater	AH83.70-P-0003-02B
Notes on repairing telestart	MODEL 163 Telestart T60 in retrofitted stationary heater	AH83.70-P-0003-02C
Notes on repairing Telestart	MODEL 215, 220	AH83.70-P-0003-02M
Notes on differentiating characteristics of Telestart	MODEL 163, 168, 170, 202, 210 ...	AH83.70-P-0003-03A
Notes on installation of timer	MODEL 163, 168, 170, 202, 208 ...	AH83.70-P-0008-01A
Notes on installing stationary heater	MODEL 163, 168, 170, 202, 203, 208, 209, 210, 211, 220, 414 Retrofitted stationary heater	AH83.70-P-0008-02A
Notes on installing stationary heater	MODEL 450.3 /4 (except, 450.418)	AH83.70-P-0008-02SM
Notes for timer and/or Telestart	MODELS 163.###1A as of 145270, 163.### 1X as of 708319 Retrofitted stationary heater	AH83.70-P-0008-03A
Notes for stationary ventilation with Telestart	MODEL 163.###, 168.###, 170.###, 202.###, 208.###1# Telestart T70	AH83.70-P-0009-01A
Notes on Telestart with GSM antenna	MODEL 168, 170, 202, 208.3, 210 Telestart T70	AH83.70-P-0009-02A
Conduct if air conditioning system is damaged or leaking	MODEL all ...	**AH83.30-N-0004-01A**
Protect air conditioning circuit and components from moisture when carrying out repair work	MODEL all	**AH83.30-N-0005-01A**
Procedure if air conditioning system is damaged or leaking	MODEL 240	AH83.30-P-0004-01H
Conduct if air conditioning system is damaged or leaking	MODEL 199	AH83.30-P-0004-01SLR

	Protect air conditioning circuit and components from moisture when carrying out repair work	MODEL 240	AH83.30-P-0005-01H
	Protect air conditioning circuit and components from moisture when carrying out repair work	MODEL 164, 199, 203, 209, 251 ...	AH83.30-P-0005-01P
	Protect air conditioning circuit and components from moisture when carrying out repair work	MODEL 199	AH83.30-P-0005-01SLR
	Notes on removing and installing the air conditioner housing	MODEL 209, 463 ...	AH83.30-P-0006-01GM

NOTES ON HANDLING REFRIGERANT R134A - AH83.30-N-0003-01A

Air conditioning with refrigerant R134a

The refrigerant R134a is colorless and odorless.

At normal temperatures it is neither toxic nor flammable, and will not explode in the air, no matter what its mixing ratio.

The R134a refrigerant may only be used in air conditioning systems for which R134a has been specifically approved.

The refrigerant R134a must not be mixed with other refrigerants (e.g. R12).

The refrigerant R134a does not contain any chlorofluorocarbons (CFC). In contrast to other refrigerants (e.g. R12) it is not hazardous to the environment at normal temperatures. The refrigerant R134a does not damage the earth's ozone layer.

Despite these benefits, refrigerant R134a may only be extracted by experts with suitable extraction, recycling and filling equipment that includes integral disposal and reprocessing capabilities.

CONDUCT IF AIR CONDITIONING SYSTEM IS DAMAGED OR LEAKING - AH83.30-N-0004-01A

All models

The air conditioning system should never be operated if it is damaged or when there is evidence of refrigerant loss.

In the event that refrigerant is lost, lubrication can fail. This will lead to damage of the refrigerant compressor.

Evacuate damaged and/or leaking air conditioning refrigerant circuits as quickly as possible using extraction, processing and recharging equipment with integral disposal and reprocessing capabilities.

PROTECT AIR CONDITIONING CIRCUIT AND COMPONENTS FROM MOISTURE WHEN CARRYING OUT REPAIR WORK - AH83.30-N-0005-01A

All models fitted with air conditioning

Do not carry repair operations out on the air conditioning circuit in the open air during moist weather.

Moisture in the refrigerant circuit reduces the system's refrigeration output and leads to damage to the components. The acidic substances produced by moisture within the system decompose the desiccant in the fluid reservoir and damage the entire system.

After separating/unscrewing refrigerant lines, immediately seal off the connection openings so that they are airproof using suitable stop plugs (parts kit).

Replace the fluid reservoir every time you open up the refrigeration circuit.

Always store all spare components in a dry, sealed-off area. Do not remove stop plugs in new components until just before they are installed. Use special care when handling the receiver/dryer with its integral desiccation unit.

When a receiver/dryer is left open, the dryer unit quickly becomes saturated with moisture, rendering it useless.

Check drier cartridge packaging for damage. Dispose of drier cartridges with damaged packaging.

Install the desiccant cartridge no later than 20 minutes after opening the packaging.

Further protection against moisture is provided by carefully evacuating the air conditioning system following repair operations. By generating vacuum in the system, the evacuation process removes any moisture that might have penetrated into the system.

NOTES ON RETROFITTING AN AIR CONDITIONING SYSTEM - AH83.30-P-0001-02A

Do not remove the plugs on any of the components until immediately prior to installation.

Fit all AC lines with new sealing rings. Coat thread and sealing rings with compressor oil.

BASIC KNOWLEDGE

VENTILATION, FUNCTION - GF83.10-P-2000GH

MODEL 163 up to 31.8.01

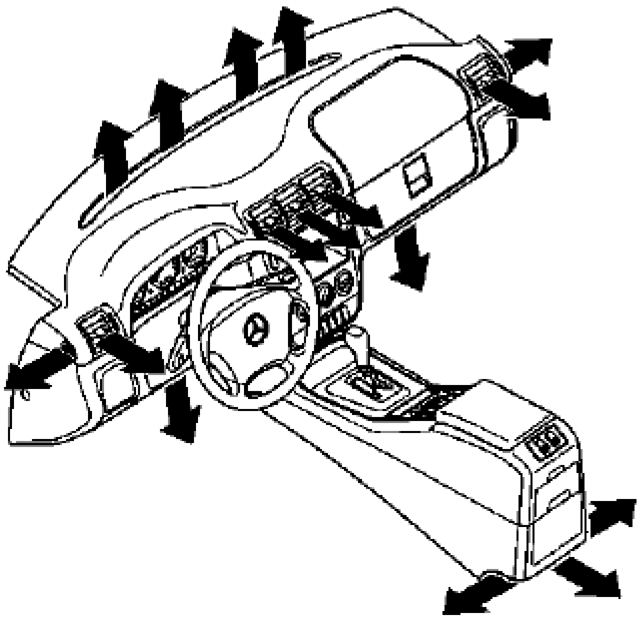


Fig. 1: Identifying Ventilation System Function

Function

The ventilation system ensures:

- that the windshield and windows are kept without mist.
- there is a supply of fresh air to the vehicle occupants.
- that constant and pleasant temperatures are quickly achieved in the vehicle interior.

Ventilation is achieved with the assistance of the blower motor (M2) during normal operation, when vehicle is stationary or to increase the air quantity.

Fresh air is drawn into the heater housing via the air inlet. Depending on the control module setting, the air is directed through the air ducts to the air vents in the interior.

The air flows out of the vehicle again through the rear vent via ventilation slots to the left and right in the area below the rear side windows.

In recirculating air mode, air is drawn out of the interior of the vehicle through the recirculating air flap by the blower motor (M2), and passed to the heater housing.

Air inlet, location/function		**GF83.10-P-2138GC**
Air ducts, location/task/design		**GF83.10-P-2139GH**

	Rear vent, location/task/function		**GF83.10-P-2143GC**
	Defroster vent, location/task/function		**GF83.10-P-2144GC**
	Center nozzle, location/task/function		**GF83.10-P-2149GC**
	Lateral nozzle, location/task/function		**GF83.10-P-2150GC**
	Front footwell air outlet, location/task/function		**GF83.10-P-2145GC**
	Rear footwell air outlet, location/task/function		**GF83.10-P-2146GC**
	Blower, location / task / design / function		**GF83.10-P-2102GC**
	Series resistor group, location/task/function		**GF83.10-P-2161GC**
	Dust filter, location / task / function		**GF83.10-P-2142GH**
	Fresh air/recirculation flap, location / task / function		**GF83.20-P-2111GC**
	Recirculating air switch, location/task/design/ function		**GF83.10-P-2117GH**
	Fresh air/recirculation flap actuator motor, location / task / function		**GF83.30-P-2116GC**
	Blower switch, location/task/design/function		**GF83.25-P-2100GC**
	Air distribution switch, location/task/design/ function		**GF83.25-P-2101GH**
	Heater housing position/task/function	except in the case of code 580	**GF83.20-P-2110GC**
	Evaporator housing, location/task/function	for code 580 only	**GF83.30-P-2119GH**

VENTILATION, FUNCTION - GF83.10-P-2000GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

Air distribution duct

The air distribution duct and the existing air outlets for ventilating the vehicle interior are shown by the arrows.

Temperature-controlled air flows out of all the air outlets (red/blue arrows).

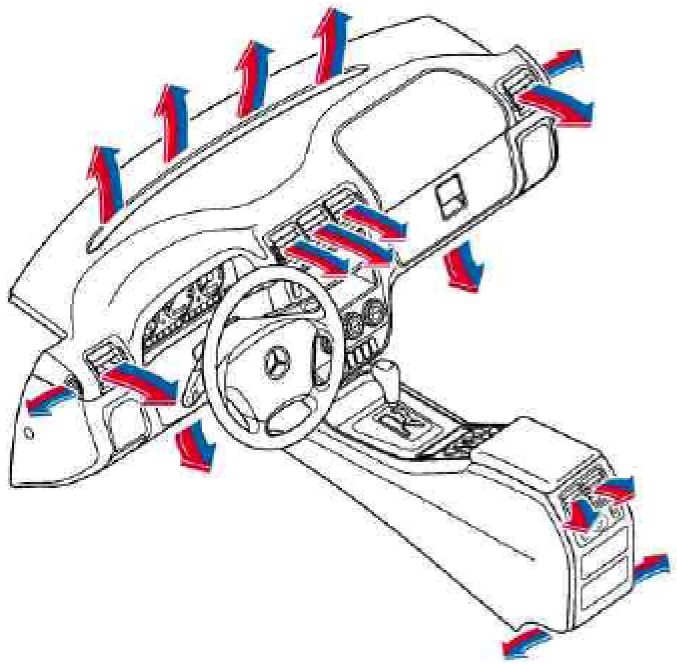


Fig. 2: Identifying Ventilation Function - Air Distribution Duct

Function

The ventilation system ensures:

- that the windshield and windows are kept without mist.
- that there is a supply of fresh air to the vehicle occupants.
- that constant and pleasant temperatures are quickly achieved in the vehicle interior.

Ventilation is achieved with the assistance of the blower motor during normal operation, when vehicle is stationary or to increase the air quantity.

Fresh air is drawn into the evaporator housing via the air inlet. Depending on the automatic air conditioning push-button control module setting, the air is directed through the air ducts to the air vents in the interior.

The air flows out of the vehicle again through the rear vent via ventilation slots to the left and right in the area below the rear side windows.

In recirculation mode, air is drawn out from the vehicle interior via the fresh air/recirculation flap (recirculation setting) by the blower motor and passed to the evaporator housing.

The ventilation is essentially divided into **heating operation** and **cooling operation.**

Heating operation

Two main objectives are pursued in heating operation:

- rapid heating and even control of in-car temperature
- good visibility through windshield and front side windows

In the starting phase the headroom temperature is deliberately increased, in order to meet the passengers' initial increased heat requirements. The temperature and the duration depend on the outside temperature and the in-car temperature.

As far as good visibility is concerned, special control measures to accelerate defrosting of the windows are taken during the starting phase, depending on the ambient conditions.

In closed-loop operation the footwell vents are mainly used to control the in-car temperature. The center nozzle is fully closed. The defrosting control measures are reduced.

Cooling operation

During cooling operation the objective is to cool the interior rapidly and evenly control the temperature.

Window fogging is not usually a problem during maximum cooling operation and therefore does not require special measures.

In the starting phase the headroom temperature is deliberately reduced. The temperature and the duration depend on the outside temperature and the in-car temperature.

Furthermore, the cooling capacity can be reduced during subsequent operation since continuous partial recirculating air operation can be achieved.

In closed-loop operation the center nozzles are mainly used to control the in-car temperature.

Bi-level operation (2-level operation)

In bi-level operation the temperature of the interior is controlled by a combination of the footwell nozzles and the center nozzles.

The objective is to create **stratification** , which gives the passengers **warm feet** and a **cooler head** .

The air distribution shifts in the direction of heating or cooling operation depending on the controller status trend.

Rear compartment ventilation

The rear compartment nozzles are supplied with temperature-controlled air by the front compartment automatic air conditioning. The rear compartment nozzle outlet temperature can therefore not be separately controlled.

The air quantity and the air distribution are available as adjustable parameters. The passengers in the rear can control the ventilation themselves using appropriate buttons.

In automatic mode the air quantity and the air distribution are controlled depending on the status of the automatic air conditioning.

	Air inlet, location/function		**GF83.10-P-2138GC**
	Air ducts, location/task/design		**GF83.10-P-2139GH**
	Rear vent, location/task/function		**GF83.10-P-2143GC**
	Defroster vent, location/task/function		**GF83.10-P-2144GC**
	Center nozzle, location/task/function		**GF83.10-P-2149GC**
	Lateral nozzle, location/task/function		**GF83.10-P-2150GC**
	Rear nozzle position/task//function		**GF83.10-P-2151GI**
	Front footwell air outlet, location/task/function		**GF83.10-P-2145GC**
	Rear footwell air outlet, location/task/function		**GF83.10-P-2146GI**
	Blower motor, position/task//function		**GF83.10-P-2170GI**
	Rear blower motor, position/task/design/function		**GF83.10-P-2168GI**
	Blower regulator, location / task / function		**GF83.10-P-2141GI**
	Rear ventilation electronic blower regulator location/task/function		**GF83.10-P-2176GI**
	Combination filter, location/task/function		**GF83.10-P-2128GI**
	Defroster vent flap actuator motor, location/task/ function		**GF83.10-P-2175GI**
	Footwell flap actuator motor, location / task / function		**GF83.10-P-2132GI**
	Center outlet flap actuator motor, location / task / function		**GF83.10-P-2172GI**
	Rear shutoff flap actuator motor, location / task / function		**GF83.10-P-2171GI**
	Rear air distribution flap actuator motor, location / task / function		**GF83.10-P-2173GI**
	Fresh air/recirculation flap, location / task / function		**GF83.20-P-2111GC**
	Fresh air/recirculation flap actuator motor, location / task / function		**GF83.30-P-2116GC**
	Blending air flap actuator motor, location / task / function		**GF83.57-P-2112GI**
	Blower switch, location/task/design/function		**GF83.25-P-2100GI**
	Air distribution switch, location/task/design/ function		**GF83.25-P-2101GI**
	Recirculating air push-button, location/task/ function		**GF83.40-P-2145GI**
	Air conditioner housing, location / task / design / function		**GF83.40-P-2105GI**

AIR INLET, LOCATION - GF83.10-P-2100-01GH

The air inlet (1) is located at the bottom of the windshield.

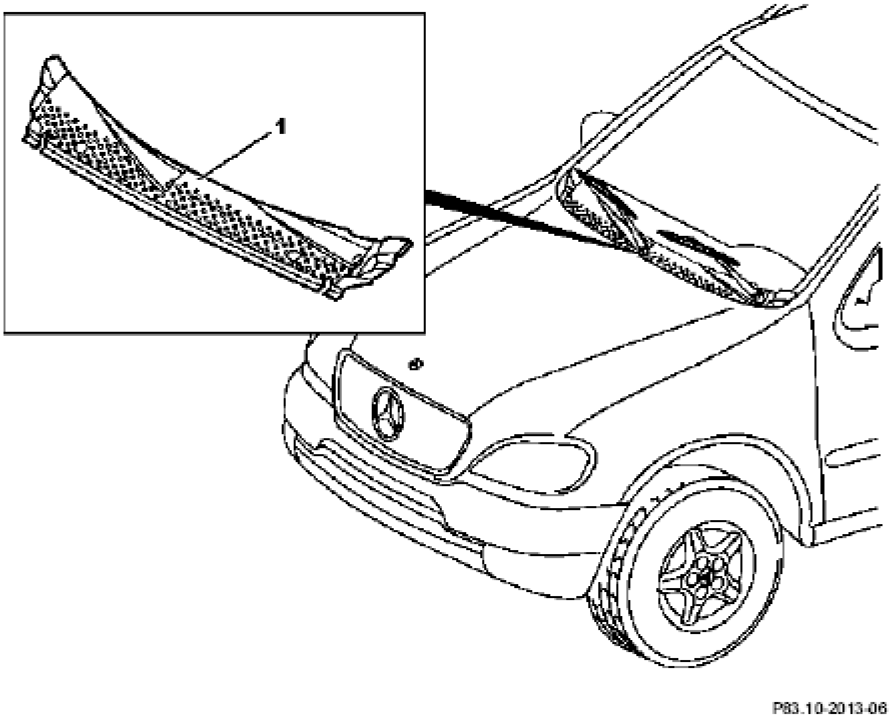


Fig. 3: Identifying Air Inlet

AIR DUCT LOCATIONS - GF83.10-P-2101-01GH

The lateral nozzle and side window defroster nozzle (3) air ducts are on the left and right below the instrument panel.

The windshield defroster nozzle air duct (2) is on top of the heater/evaporator housing (front center) below the instrument panel.

The center nozzle air duct (1) is on top of the heater box/evaporator housing behind the center nozzle.

The front footwell air duct (4) is integrated in the heater/evaporator housing.

The rear footwell air duct (5) is below the center console.

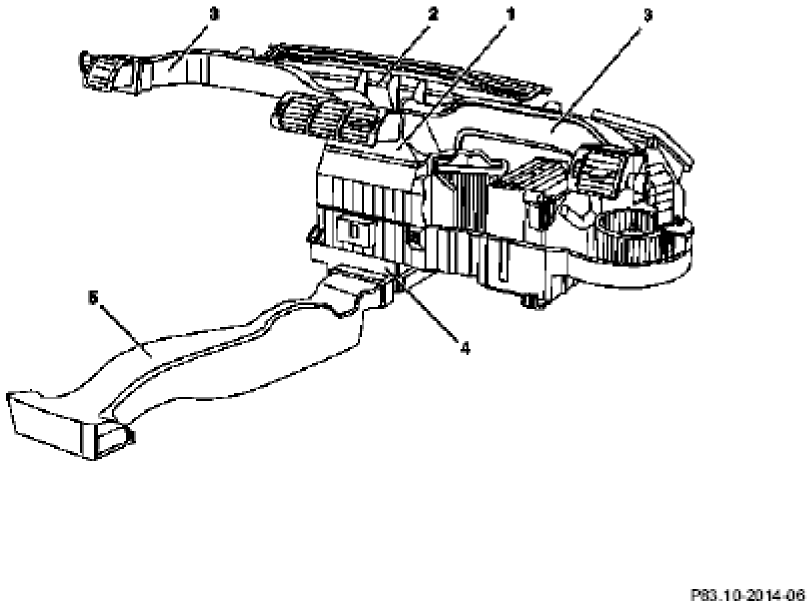


Fig. 4: Identifying Air Duct (Up To 31.08.01)

AIR DUCT LOCATIONS - GF83.10-P-2101-01GI

The lateral nozzle and side window defroster nozzle (3) air ducts are on the left and right below the instrument panel.

The windshield defroster nozzle air duct (2) is on top of the evaporator housing (front center) below the instrument panel.

The center nozzle air duct (1) is on top of the evaporator housing behind the center nozzle.

The front footwell air duct (4) is integrated in the heater/evaporator housing.

The rear compartment air duct (5) is located below the center console.

The rear footwell air duct (6) is at the bottom next to the rear blower behind the center console.

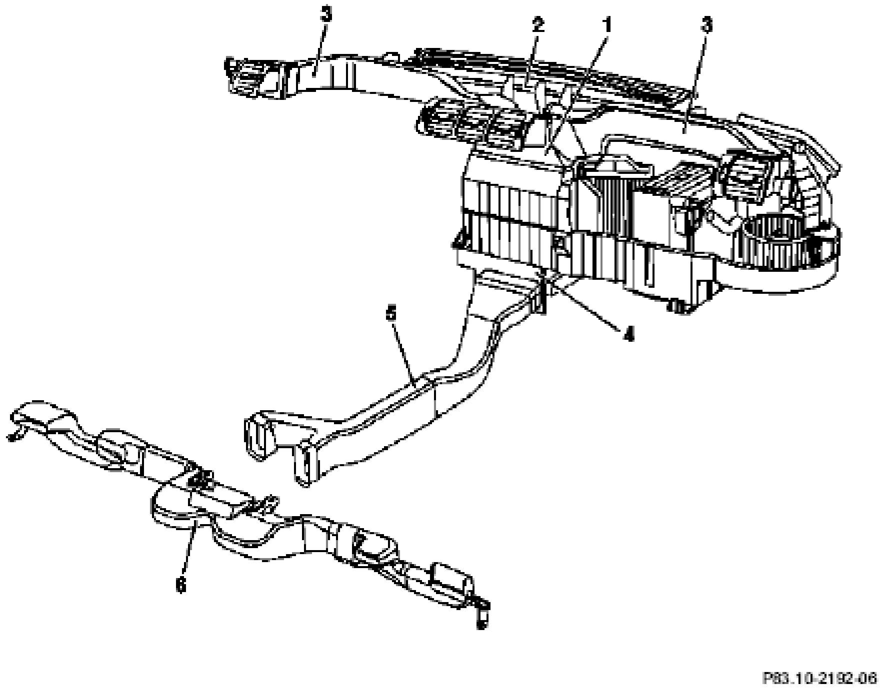


Fig. 5: Identifying Air Duct (As Of 1.09.01)

BLOWER, LOCATION - GF83.10-P-2102-01GH

The blower (M2) is below the instrument panel to the bottom right of the heater box/evaporator housing (3).

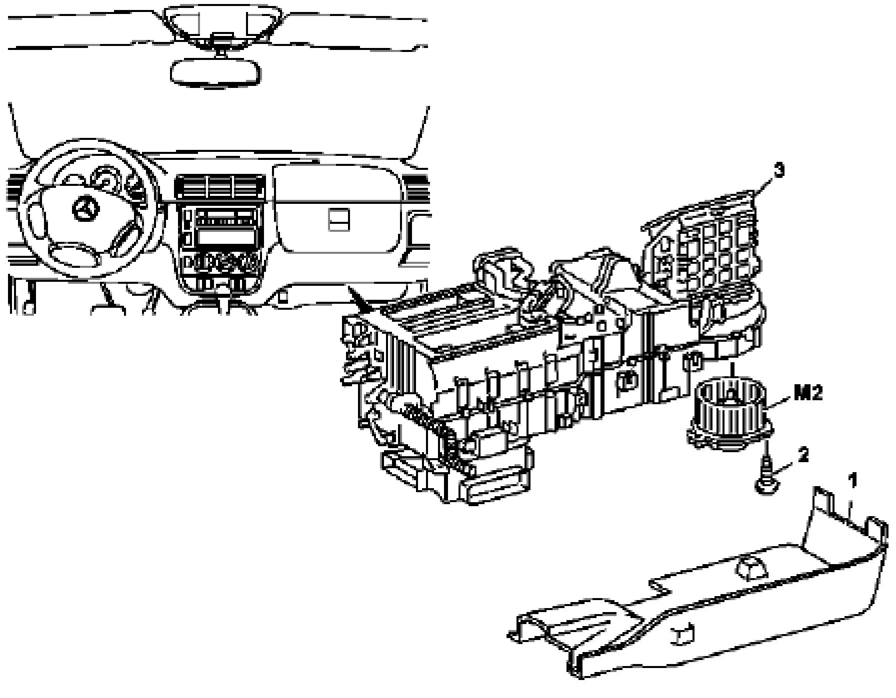


Fig. 6: Identifying Blower And Heater Box/Evaporator Housing

BLOWER, FUNCTION - GF83.10-P-2102-02GH

Function

Different control voltages are provided at the blower (M2) via the series resistors depending on the blower switch setting. This produces different blower (M2) speeds.

Pin assignment of series resistor assembly R14	Assigned resistor	Blower switch setting	Blower (M2) control voltage
Pin 1	R3	Blower level 3	10V
Pin 2	R2+R3	Blower level 2	8V
Pin 3	R1+R2+R3	Blower level 1	4V
Pin 4	None	Blower level 4	12V

BLOWER, LOCATION / TASK / DESIGN / FUNCTION - GF83.10-P-2102GC

MODEL 163 up to 31.8.01, 168

	Blower, location	Model 168 Model 163	GF83.10-P-2102-01GC **GF83.10-P-2102-01GH**
	Blower, task	In fresh air mode the blower (M2) draws in fresh air, and in recirculating air mode it draws in air from the vehicle interior into the heater or evaporator housing via the recirculating air flap.	
	Blower design	The blower (M2) is designed as a twin-pipe radial blower.	
	Blower, function	Model 168 Model 163	GF83.10-P-2102-02GC **GF83.10-P-2102-02GH**

BLOWER CONTROLLER FUNCTION - GF83.10-P-2103-01GI

Function

The blower switch passes on a control voltage (0 - 6 V) to the blower regulator (A32n1) via the AAC push-button control module (N22) and the AC bus. Depending on the control voltage which is present, this then regulates the blower motor operating voltage (0 - 12 V). This facilitates blower speed control of 0-100 %.

The Auto button can also be used to select

(AUTO) automatic mode.

The blower regulator then controls the blower motor operating voltage, depending on the actual measured in-car temperature and the selected target temperature

(0-12 V). This facilitates blower speed control of 0-100 %.

DUST FILTER, LOCATION - GF83.10-P-2104-01GH

The dust filter (1) is behind the instrument panel bottom section at the passenger side in the heater/evaporator housing.

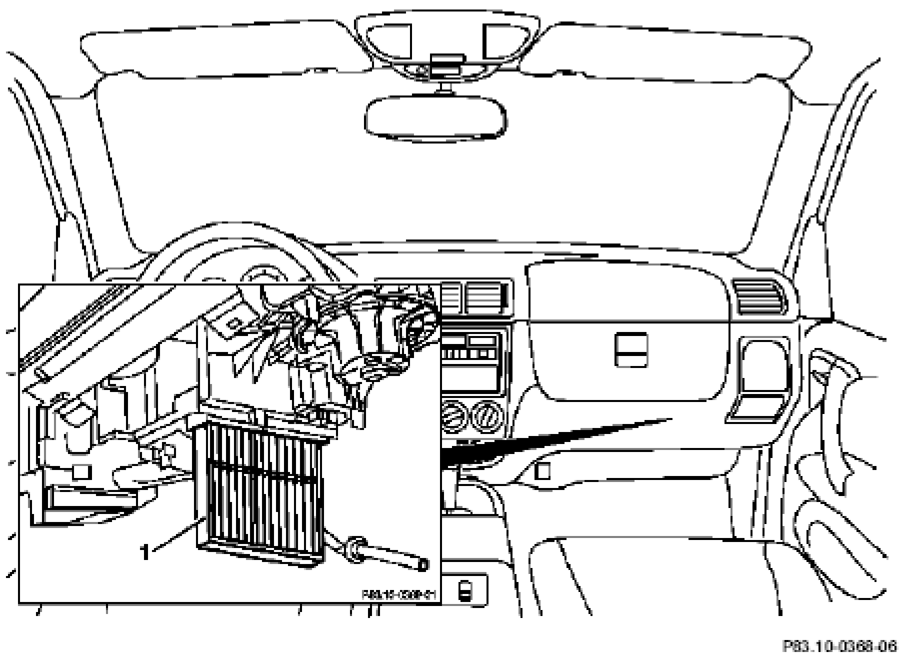


Fig. 7: Identifying Dust Filter

REAR VENTILATION, FUNCTION - GF83.10-P-2105-01GC

Function

The louvered-type flaps in the rear vent open from the pressure of the air flowing through the vehicle and allow it to exit.

If a vacuum is present in the vehicle, as happens when driving with a window or the sliding roof open, the flaps close automatically due to the force of gravity. This prevents exhaust gases, dust and moisture from being sucked in.

REAR VENTILATION, LOCATION - GF83.10-P-2105-02GH

The rear vents (1) are located on the left and right behind the rear bumper.

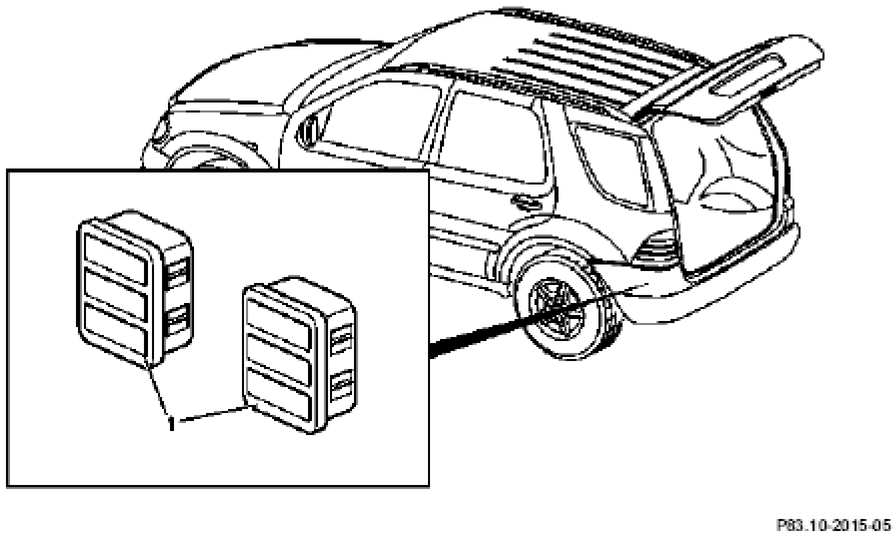


Fig. 8: Identifying Rear Vents

DEFROSTER NOZZLE, LOCATION - GF83.10-P-2106-01GH

Windshield defroster nozzle

The windshield defroster nozzle (1) is located in the instrument panel below the windshield.

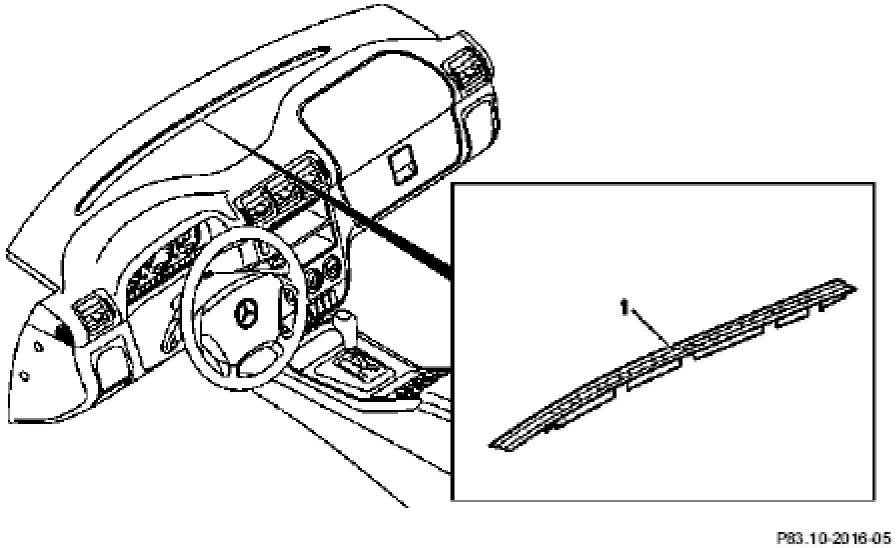


Fig. 9: Identifying Windshield Defroster Nozzle

Side window defroster nozzles

The side window defroster nozzles (1) are located on the left and right in the instrument panel.

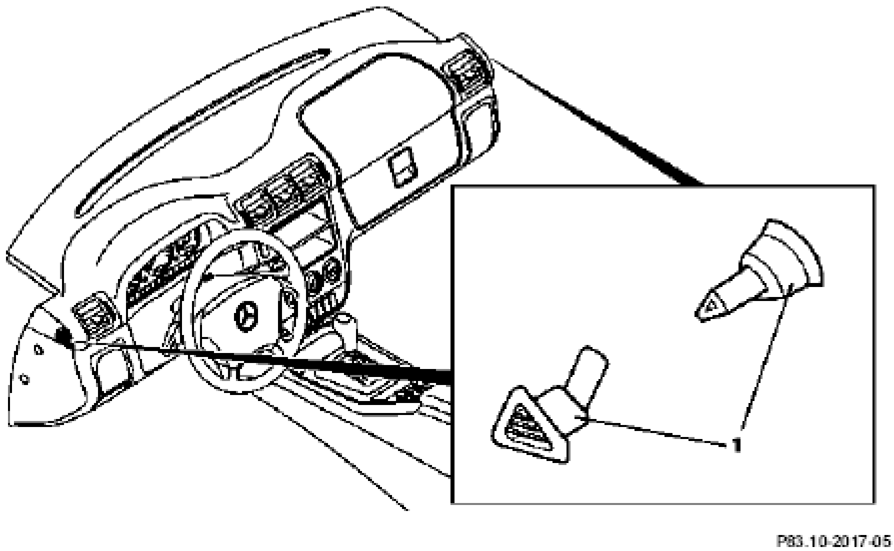


Fig. 10: Identifying Side Window Defroster Nozzles

CENTER NOZZLE, FUNCTION - GF83.10-P-2107-01GH

Function

The dial on the left allows the left and middle outlets in the center nozzle to be opened and closed infinitely separately from the right outlet which is controlled in the same manner by the dial on the right.

The air exit direction can be adjusted upward, downward, to the left, right or center with three separately adjustable sets of louvers.

Cooled/heated air exits from the center nozzle (1).

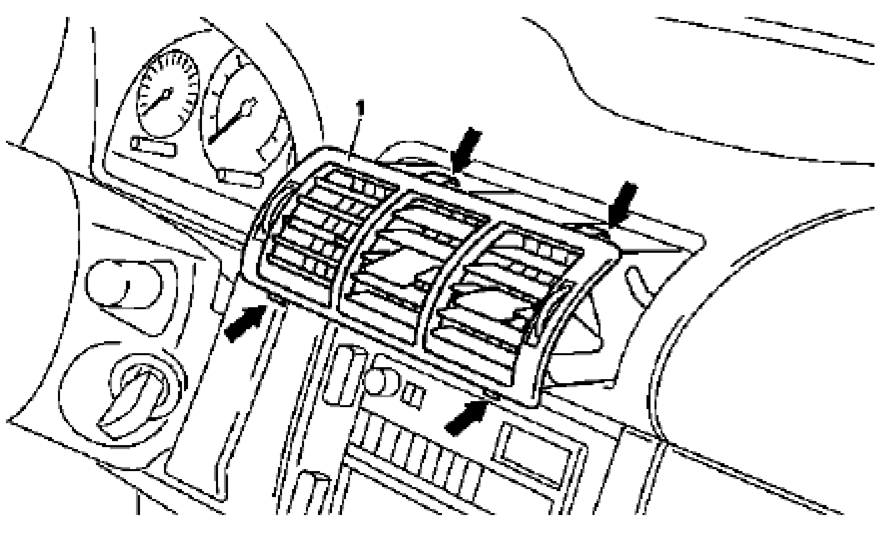


Fig. 11: Identifying Center Nozzle

CENTER NOZZLE, LOCATION - GF83.10-P-2107-02GH

The center nozzle (1) is located above the center console in the instrument panel.

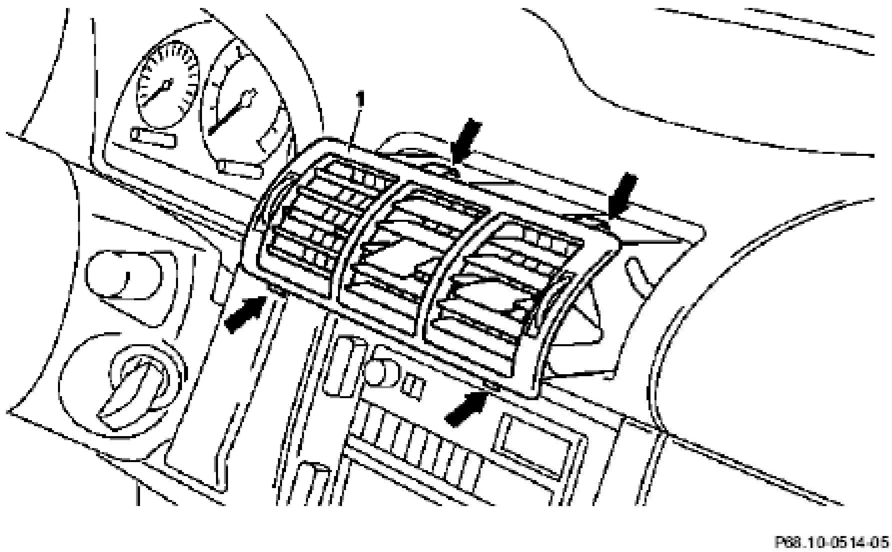


Fig. 12: Identifying Center Nozzle

SIDE NOZZLE, FUNCTION - GF83.10-P-2108-01GH

Function

The side nozzle (3) can be adjusted infinitely or opened and closed completely with the dial.

The air exit direction can be adjusted upward, downward, to the left, to the right or middle as desired with the louver system.

Heated/cooled air exits through the side nozzle (3).

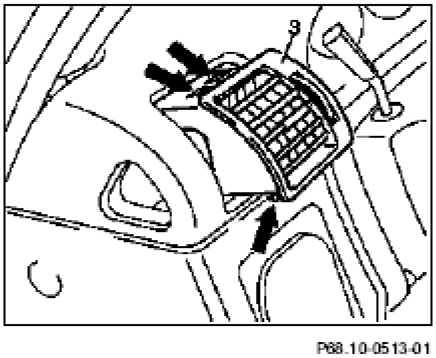


Fig. 13: Identifying Side Nozzle

SIDE NOZZLE, LOCATION - GF83.10-P-2108-02GH

The side nozzles (3) are located at the outside left and right in the instrument panel.

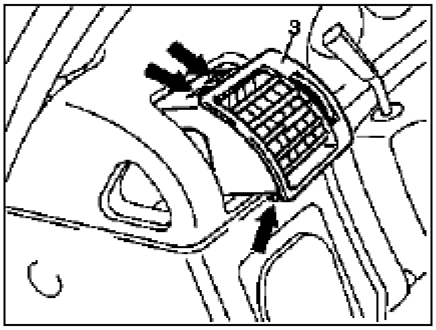


Fig. 14: Identifying Side Nozzle

FRONT FOOTWELL AIR VENT FUNCTION - GF83.10-P-2109-01GC

Function up to 31.08.01

The air supply to the front footwell air vents can be opened and closed via the air distribution switch using a cable.

There is no separate adjusting facility. Temperature-controlled air comes out of the front footwell air vents.

Function as of 1.09.01

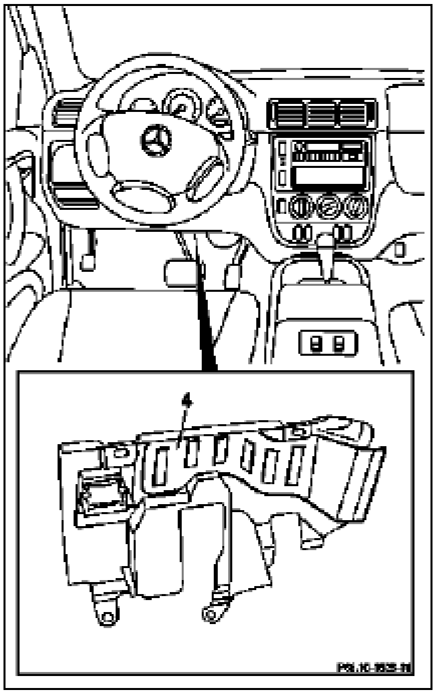
The air supply to the front footwell air vents can be opened and closed via the air distribution switch with the footwell flap actuator motor.

There is no separate adjusting facility. Temperature-controlled air comes out of the front footwell air vents.

FRONT FOOTWELL AIR OUTLET, LOCATION - GF83.10-P-2109-02GH

The front footwell air outlet (4) (driver's side) is installed in the lower section of the instrument panel.

The front footwell air outlet (passenger's side) is integrated into the heater/A/C housing.



P83.10-2019-03

Fig. 15: Identifying Front Footwell Air Outlet

REAR FOOTWELL AIR VENT FUNCTION - GF83.10-P-2110-01GC

Function

The air supply to the rear footwell air vent can be opened and closed via the air distribution switch.

There is no separate adjusting facility. Temperature-controlled air comes out of the rear footwell air vent.

REAR FOOTWELL AIR VENT FUNCTION - GF83.10-P-2110-01GI

The air supply to the rear footwell air vent can be adjusted by operating the rear compartment air distribution switch ( ) and the rear air distribution flap actuator motor (M2/21) that it actuates.

The quantity of air can be adjusted by operating the blower button ( ) and the rear blower motor (M2/1) that it actuates.

Pressing the Auto button (AUTO) causes the automatic air conditioning push-button control module to regulate the supply of air to the rear footwell air vent and the air quantity.

Temperature-controlled air comes out of the rear footwell air vent.

REAR FOOTWELL AIR VENT LOCATION - GF83.10-P-2110-02GH

The rear footwell air vent (three vents) is integrated in the rear footwell air duct (5) and is beneath the center

console.

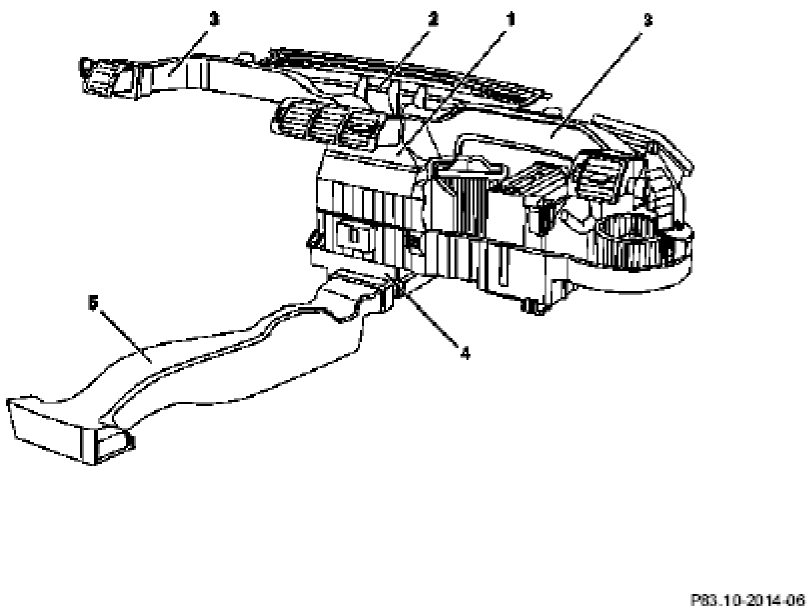


Fig. 16: Identifying Rear Footwell Air Vent

REAR NOZZLE FUNCTION - GF83.10-P-2111-01GI

Function

The air flow direction of the rear nozzle (1) can be directed up, down, left or right as required using two individually-adjustable slatted shutters (2, 3).

The air distribution between the rear compartment and the rear footwell can be adjusted by operating the rear compartment air distribution switch ( ) and the rear air distribution flap actuator motor (M2/21) that it actuates.

The quantity of air can be adjusted by operating the blower button ( ) and the rear blower motor (M2/1) that it actuates.

Operating the Auto button (AUTO) causes the AAC push-button control module (N22) to regulate the air distribution and air quantity.

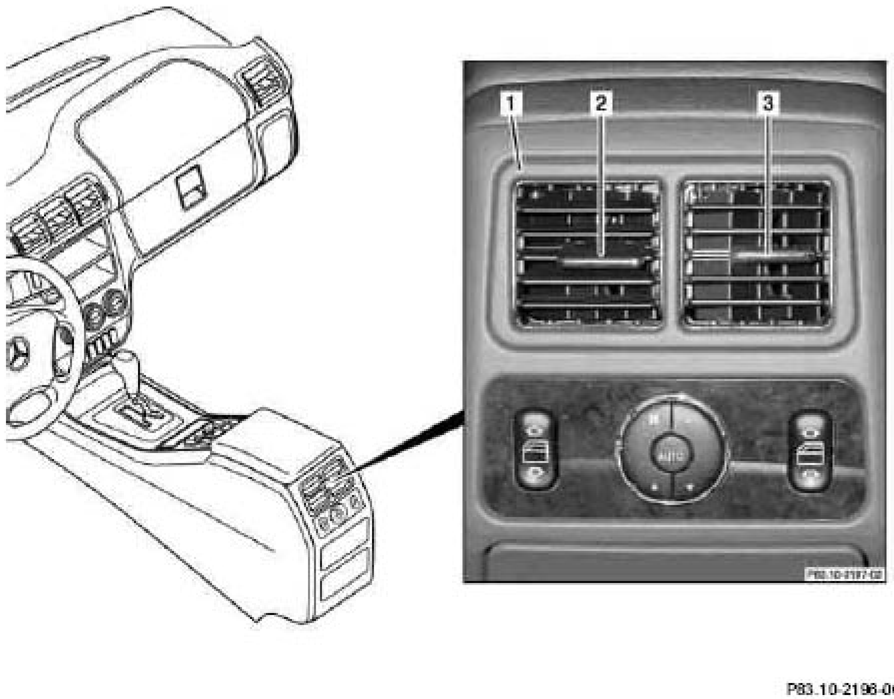


Fig. 17: Identifying Rear Nozzle And Two Individually-Adjustable Slatted Shutters

RECIRCULATING AIR SWITCH FUNCTION - GF83.10-P-2117-01GH

Function

Pressing the recirculating air switch ( ) actuates the fresh air/recirculating air flap actuator motor (M39), which opens the recirculating air flap using a mechanical operating mechanism and simultaneously closes the fresh air supply.

If the manual recirculating air system is active the diode illuminates in the recirculating air switch ( ).

RECIRCULATING AIR SWITCH LOCATION - GF83.10-P-2117-02GH

The recirculating air switch ( ) is in the heater control unit (S98).

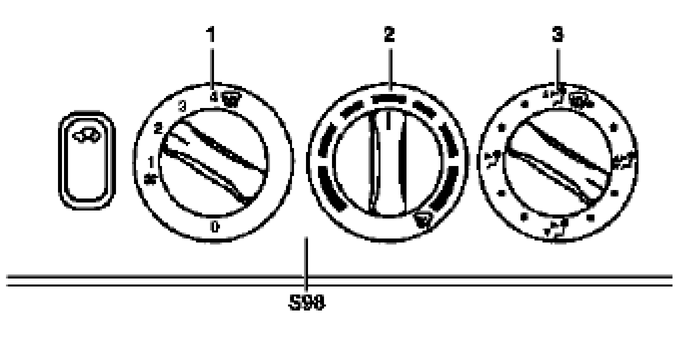


Fig. 18: Identifying Recirculating Air Switch

RECIRCULATING AIR SWITCH LOCATION/TASK/DESIGN/FUNCTION - GF83.10-P-2117GH

MODEL 163 up to 31.8.01

Recirculating air switch location		**GF83.10-P-2117-02GH**
Recirculating air switch, task	The recirculating air switch ( ) is used to operate the fresh air/recirculating air flap.	
Recirculating air switch, design	The recirculating air switch ( ) is equipped with an LED as a malfunction indicator lamp.	
Recirculating air switch function		**GF83.10-P-2117-01GH**

SERIES RESISTOR GROUP, POSITION - GF83.10-P-2124-01GH

The series resistor group (R14) is at the bottom right of the heater/ evaporator housing (1) behind the bottom section of the instrument panel at the passenger side (2).

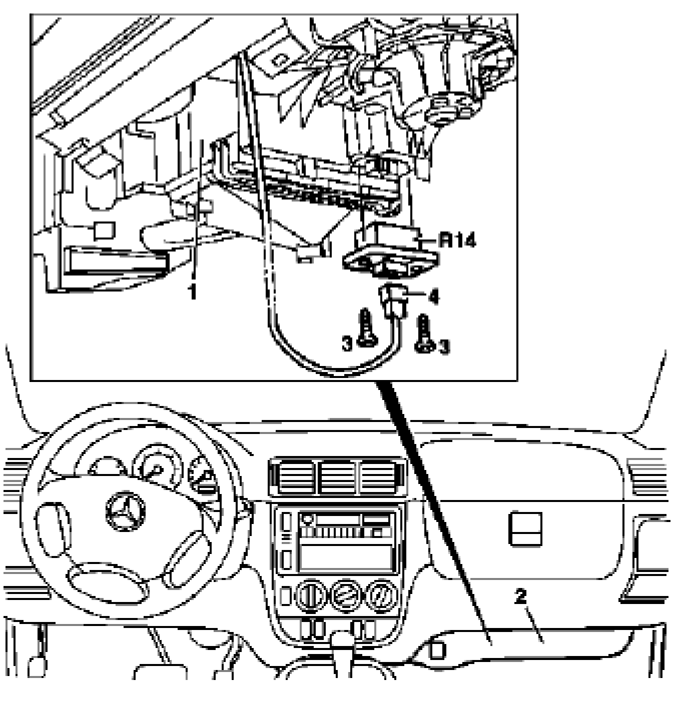


Fig. 19: Identifying Series Resistor Group

SERIES RESISTOR ASSEMBLY FUNCTION - GF83.10-P-2124-02GH

Function

The series resistor assembly (R14) is comprised of three resistors which can be interconnected, via series connection, to form an overall resistor. Depending on the setting of the blower switch, current is guided via the resistors assigned to the set blower level to the blower (M2). Different control voltages are therefore present at the blower (M2), as a result of which the blower (M2) operates at different rotational speeds.

Pin assignment of series resistor assembly R14	Assigned resistor	Blower switch setting	Blower (M2) control voltage
Pin 1	R3	Blower level 3	10V
Pin 2	R2+R3	Blower level 2	8V
Pin 3	R1+R2+R3	Blower level 1	4V
Pin 4	None	Blower level 4	12V

COMBINATION FILTER, LOCATION/TASK/DESIGN/FUNCTION - GF83.10-P-2128GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

1 *Combination filter*

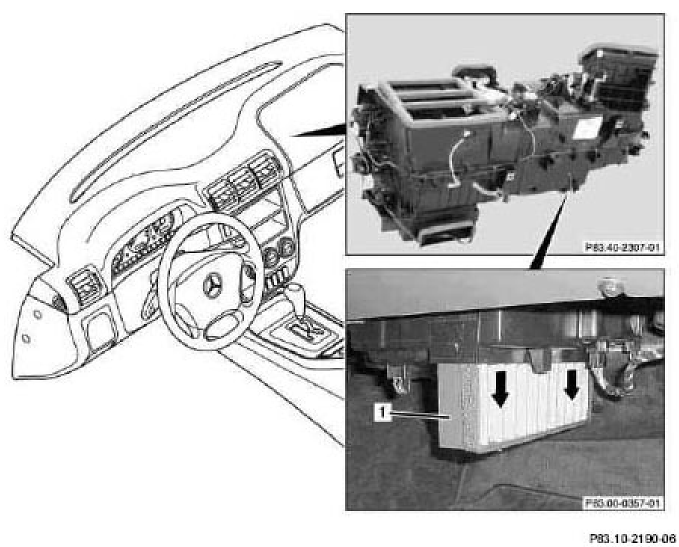


Fig. 20: Identifying Combination Filter

Combination filter location	The combination filter (1) is at the bottom of the automatic air conditioning box.
Combination filter task	The combination filter (1) removes impurities and odors from the air flowing through the automatic air conditioning box. Fresh air and recirculating air are filtered.
Combination filter design	The combination filter (1) consists of fleece and a large number of so-called sliver absorbers that are evenly distributed over an air-permeable carrier mat.
Combination filter function	The combination filter (1) filters over 80% of particles from 0.3 in size and up to 100% of 0.5 u sized particles and pollen. The sliver adsorbers also continuously absorb odors and pollutants and release them again in extremely small concentrations after a certain time.

FOOTWELL FLAP ACTUATOR MOTOR, FUNCTION - GF83.10-P-2132-02GI

Function

Rotating the air distribution switch in the AAC push-button control module (N22) actuates the footwell flap actuator motor via the AC bus. The footwell flap actuator motor (M2/21) controls the footwell flap, which adopts the following positions according to requirements.

Switching logic

- footwell flap closed = 0%
- footwell flap open = 100%

Automatic footwell flap control (Auto button engaged)

The footwell flap is opened depending on the following values

- blending air flap setting
- Coolant temperature
- Evaporator temperature

linear up to 100 % open.

Footwell flap control via push-button control module

(Clock type switch setting of air distribution switch)

1 o'clock	2 o'clock	3 o'clock	4 o'clock	5 o'clock	6 o'clock
17%	32%	50%	68%	85%	100%
7 o'clock	8 o'clock	9 o'clock	10 o'clock	11 o'clock	12 o'clock
66%	31%	0%	%	0%	0%

NOTE: All actuator motors are identical.

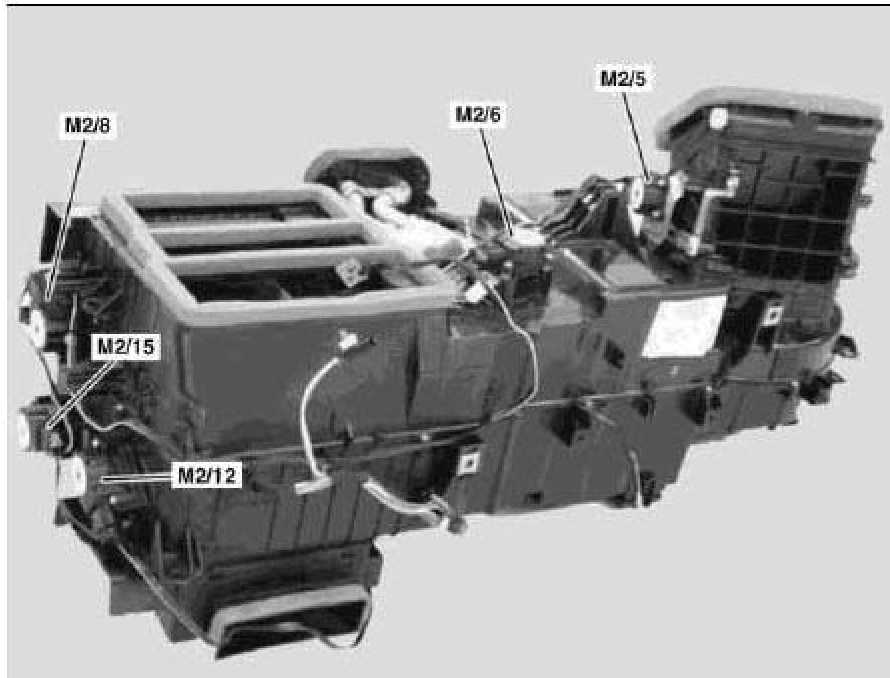
If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After replacing an actuator motor an adjustment run must be performed via the Diagnosis Assistant System (DAS), i.e. the flap OPEN and SHUT limit positions are defined and retained.

FOOTWELL FLAP ACTUATOR MOTOR, LOCATION / TASK / FUNCTION - GF83.10-P-2132GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

M2/15 Footwell flap actuator motor



P83.10-2195-06

Fig. 21: Identifying Footwell Flap Actuator Motor

	Footwell flap actuator motor, location	The footwell flap actuator motor (M2/15) is on the left on the automatic air conditioning box.	
	Footwell flap actuator motor, task	The footwell flap actuator motor operates the footwell flap for regulating the air flow to the front footwell.	
	Footwell flap actuator motor, function		**GF83.10-P-2132-02GI**

AIR INLET, LOCATION/FUNCTION - GF83.10-P-2138GC

MODEL 163, 168

	Air inlet, location	Model 168 **Model 163**	GF83.10-P-2100-01GC GF83.10-P-2100-01GH
	Air inlet, function	The fresh air required for ventilation flows through the air inlet to the heater/air conditioning housing.	

AIR DUCTS, LOCATION/TASK/DESIGN - GF83.10-P-2139GH

MODEL 163

Design shown up to 31.08.01

1 Center nozzle air duct
2 Windshield defroster nozzle air duct
3 Lateral nozzle and side window defroster nozzle air duct
4 Front footwell air duct
5 Rear footwell air duct

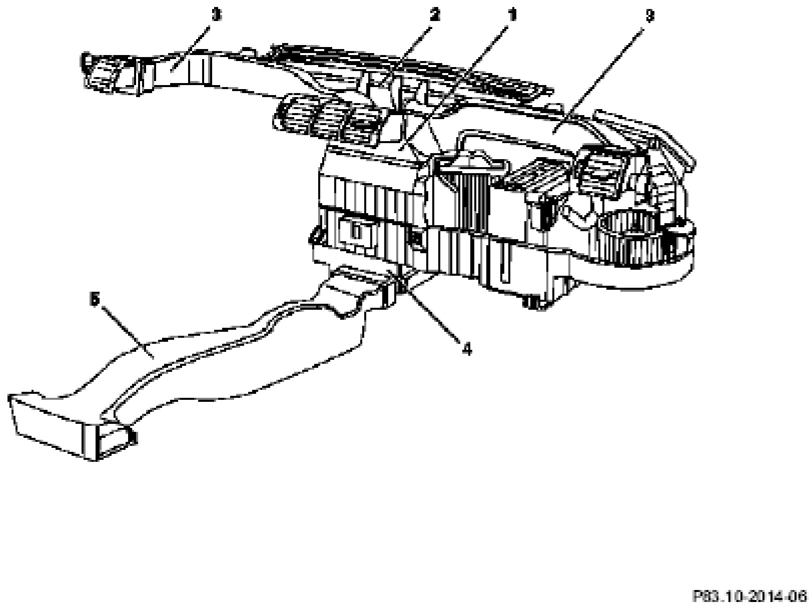


Fig. 22: Identifying Air Ducts - Design Shown Up To 31.08.01

	Air duct locations	up to 31.08.01	**GF83.10-P-2101-01GH**
		as of 1.09.01	**GF83.10-P-2101-01GI**
	Air ducts task	The air ducts (1-5) lead the air that is required to ventilate the vehicle from the heater/ evaporator housing to the air vents in the vehicle interior.	

BLOWER REGULATOR, LOCATION / TASK / FUNCTION - GF83.10-P-2141GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

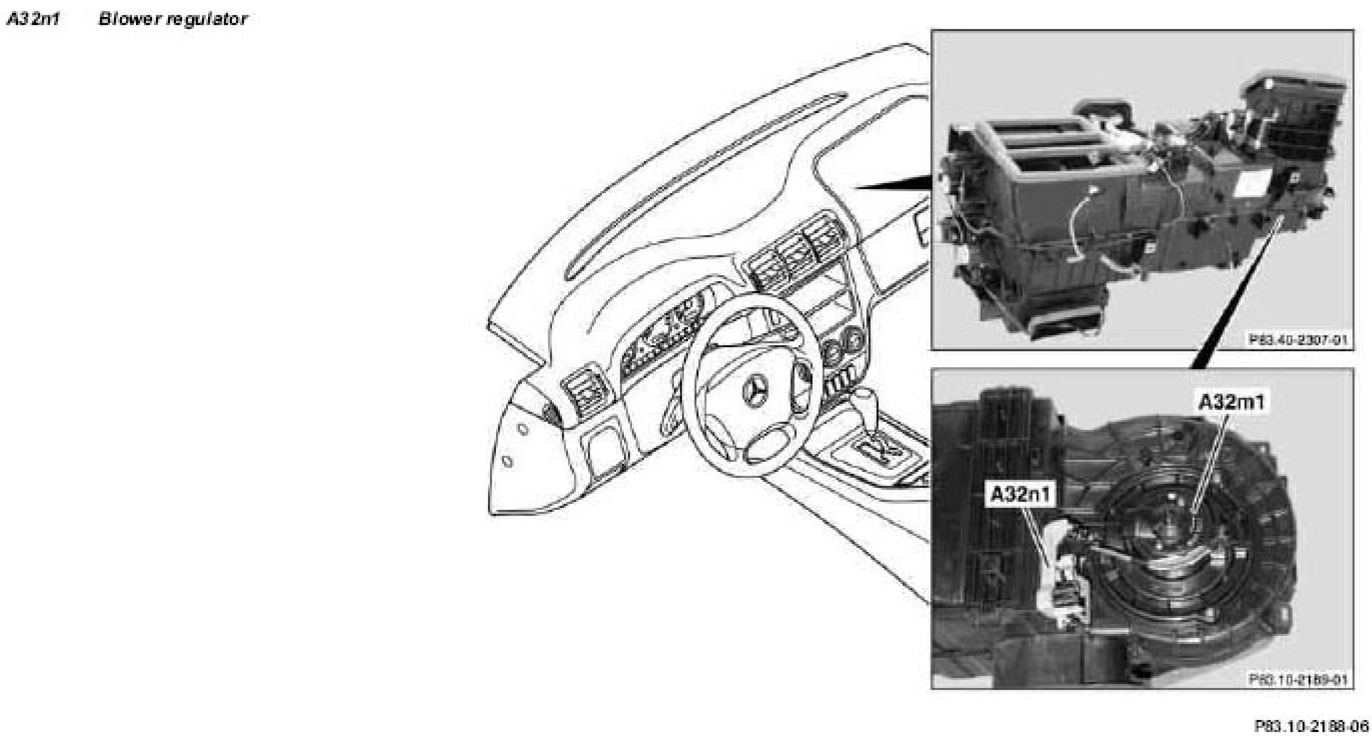


Fig. 23: Identifying Blower Regulator

Blower regulator, location	The blower regulator (A32n1) is below the glove compartment, to the right of the evaporator housing.	
Blower regulator, task	The blower regulator controls the voltage supply to the blower motor (A32m1) depending on the current blower setting.	
Blower controller function		**GF83.10-P-2103-01GI**

DUST FILTER, LOCATION / TASK / FUNCTION - GF83.10-P-2142GH

MODEL 163 up to 31.8.01

Dust filter, location		**GF83.10-P-2104-01GH**
Dust filter task	The dust filter filters the fresh air and recirculating air flowing through the heater/ evaporator housing.	
Dust filter, function	The dust filter element consists of fleece, which cleans the air flowing through. The dust filter filters over 80 % of particles from 0.3 m in size and up to 100 % of 0.5 pm sized particles and pollen.	

REAR VENTILATION, LOCATION/PURPOSE/FUNCTION - GF83.10-P-2143GC

MODEL 163, 168

	Rear ventilation, location	Model 168 Model 163	GF83.10-P-2105-02GC **GF83.10-P-2105-02GH**
	Rear ventilation, purpose	The air flowing through the vehicle passenger compartment exits the vehicle through the rear vents.	
	Rear ventilation, function		**GF83.10-P-2105-01GC**

DEFROSTER NOZZLE, LOCATION/PURPOSE/FUNCTION - GF83.10-P-2144GC

MODEL 163, 168

	Defroster nozzle, location	Model 168 Model 163	GF83.10-P-2106-01GC **GF83.10-P-2106-01GH**
	Defroster nozzle, purpose	The defroster nozzles serve for ventilation and keeping the windshield and side windows from fogging up.	
	Defroster nozzle, function	The air supply to the windshield defroster nozzles can be opened and closed with the air distribution switch. Separate adjustment is not possible. Blended air exits from the defroster nozzles.	

FRONT FOOTWELL AIR OUTLET, LOCATION/PURPOSE/FUNCTION - GF83.10-P-2145GC

MODEL 163, 168

	Front footwell air outlet, location	Model 168 Model 163	GF83.10-P-2109-02GC **GF83.10-P-2109-02GH**
	Front footwell air outlet, purpose	The front footwell air outlet serves for ventilation of the left and right front footwell.	
	Front footwell air outlet, function		**GF83.10-P-2109-01GC**

REAR FOOTWELL AIR VENT, LOCATION/TASK/FUNCTION - GF83.10-P-2146GC

MODEL 163 up to 31.8.01, 168

	Rear footwell air vent location	Model 168 Model 163	GF83.10-P-2110-02GC **GF83.10-P-2110-02GH**

Rear footwell air vent task	The rear footwell air vent is used to ventilate the rear footwell.	
Rear footwell air vent function		**GF83.10-P-2110-01GC**

REAR FOOTWELL AIR OUTLET, LOCATION/TASK/FUNCTION - GF83.10-P-2146GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

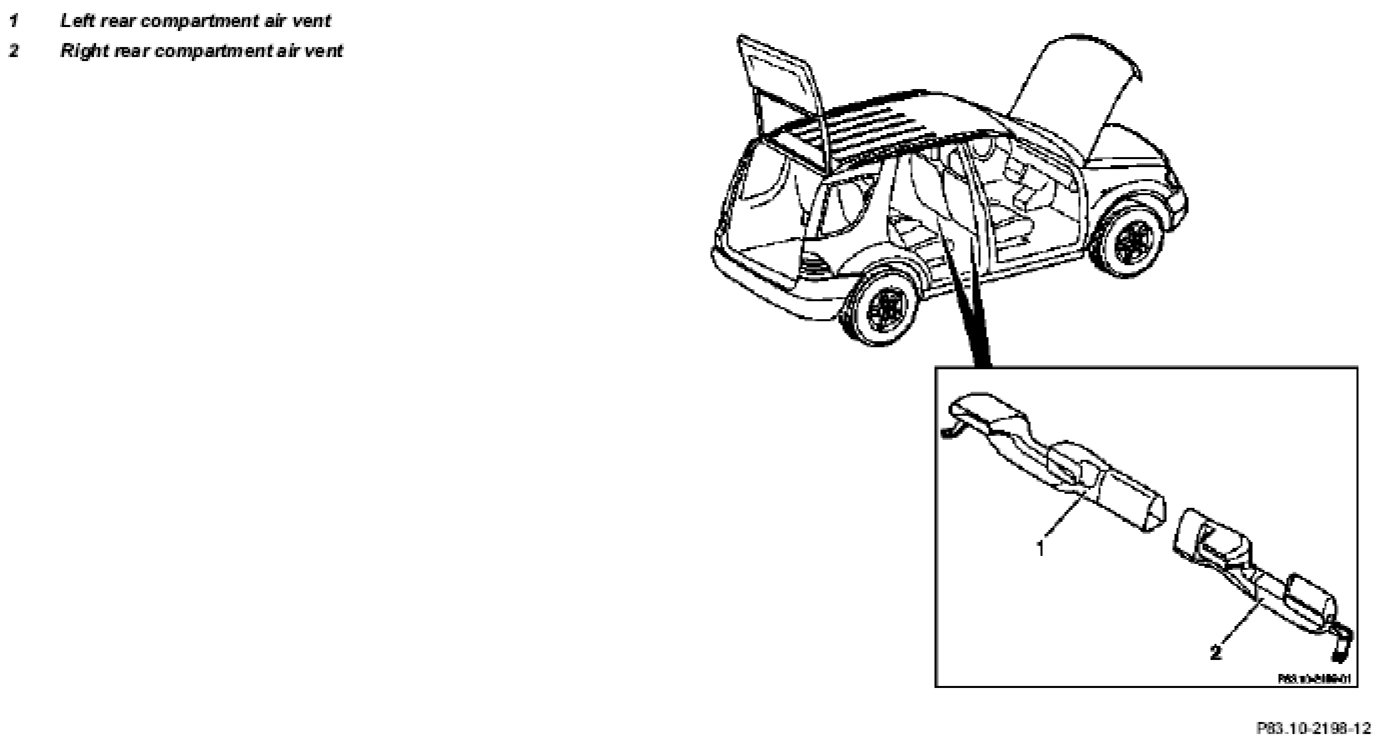


Fig. 24: Identifying Left And Right Rear Compartment Air Vent

Rear footwell air vent location	The left and right rear footwell air vents (1,2) are below the passenger and driver's seats.	
Rear footwell air vent task	The left and right rear footwell air vents (1,2) are used to ventilate the rear footwell.	
Rear footwell air vent function		**GF83.10-P-2110-01GI**

CENTER NOZZLE, LOCATION/PURPOSE/FUNCTION - GF83.10-P-2149GC

MODEL 163, 168

Center nozzle, location	Model 168	GF83.10-P-2107-02GC **GF83.10-P-**

		Model 163	**2107-02GH**
	Center nozzle, purpose	The center nozzle serves for specific guidance and distribution of the air in the upper section of the front vehicle passenger compartment.	
	Center nozzle, function	Model 168	GF83.10-P-2107-01GC
		Model 163	**GF83.10-P-2107-01GH**

SIDE NOZZLE, LOCATION/PURPOSE/FUNCTION - GF83.10-P-2150GC

MODEL 163, 168

	Side nozzle, location	Model 168	GF83.10-P-2108-02GC
		Model 163	**GF83.10-P-2108-02GH**
	Side nozzle, purpose	The left and right side nozzles serve for specific guidance and distribution of the air in the passenger compartment on the driver and passenger sides.	
	Side nozzle, function	Model 168	GF83.10-P-2108-01GC
		Model 163	**GF83.10-P-2108-01GH**

REAR COMPARTMENT NOZZLE LOCATION/TASK/FUNCTION - GF83.10-P-2151GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

1 Rear nozzle

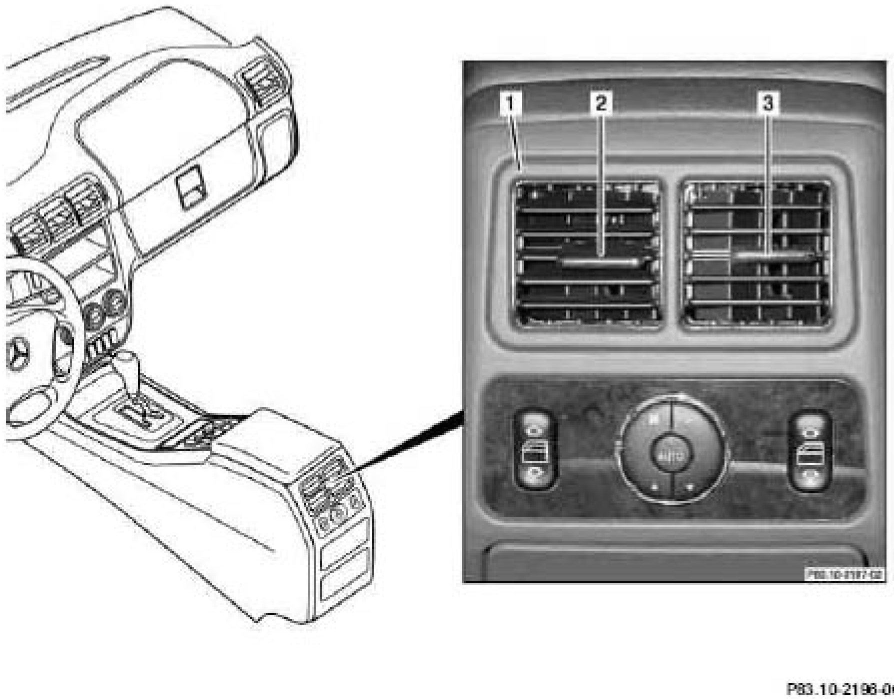


Fig. 25: Identifying Rear Nozzle

Rear nozzle position	The rear nozzle (1) is located at the rear center console.	
Rear nozzle task	The rear compartment nozzle provides specific rear compartment ventilation in addition to the rear footwell air vents.	
Rear nozzle function		**GF83.10-P-2111-01GI**

SERIES RESISTOR GROUP, LOCATION/TASK/FUNCTION - GF83.10-P-2161GC

MODEL 163 up to 31.8.01, 168

Series resistor group, position	Model 168 Model 163	GF83.10-P-2124-01GC **GF83.10-P-2124-01GH**
Series resistor assembly task	The series resistor assembly controls the blower voltage depending on the relevant blower level setting.	
Series resistor assembly function	Model 168 up to 28.02.01 Model 168 as of 01.03.01 Model 163	GF83.10-P-2124-02GC **GF83.10-P-2124-02GH** GF83.10-P-2124-

		02GD

REAR BLOWER MOTOR, FUNCTION - GF83.10-P-2168-01GI

Function

The rear blower motor (M2/1) is actuated using the blower button ( ) on the rear ventilation control panel (N72/2s3).

Pressing the blower button ( ) passes a control voltage to the rear blower motor (M2/1) via the electronic rear ventilation blower regulator (N29/2). This facilitates blower speed control of 0-100 %.

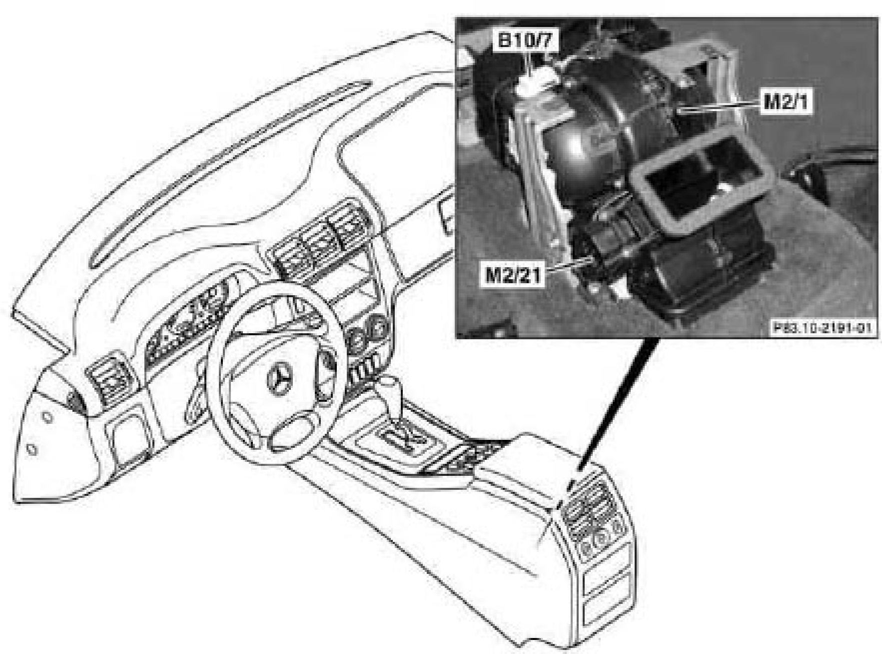
Automatic mode function

Pressing the Auto button (AUTO) on the rear ventilation control panel (N72/2s3) causes the rear blower motor to be regulated by the AAC push-button control module (N22).

REAR BLOWER MOTOR, POSITION/TASK/DESIGN/FUNCTION - GF83.10-P-2168GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

M2/1 Rear blower motor



P83.10-2200-06

Fig. 26: Identifying Rear Blower Motor

Blower, location	The rear blower motor (M2/1) is located behind the rear nozzle below the center console.	

	Blower, task	The rear blower motor (M2/1) serves to improve ventilation and cooling in the rear. The air that is drawn in by the blower in the evaporator housing is led to the rear blower motor (M2/1) via air ducts. The rear blower motor (M2/1) increases the flow of air.	
	Blower, function		**GF83.10-P-2168-01GI**

BLOWER MOTOR FUNCTION - GF83.10-P-2170-01GI

Function

The AAC push-button control module (N22) passes a control voltage of 0-6 V to the blower regulator (A32n1) via the AC bus. Depending on the control voltage which is present, this then regulates the blower motor (A32m1) operating voltage of 0-12 V. This facilitates blower speed control of 0-100 %.

The blower motor actuation (operating voltage) is influenced by the following factors:

- Blower power setting manual or AUTO
- Operating functions:

  Air distribution

  AC OFF mode

  Residual engine heat mode (actuation limited to 5 V)

- Mode status (heating, cooling)
- Coolant temperature
- Vehicle speed
- Fresh air/recirculation flap setting
- Flap positions
- Terminal 15 (blower ON), starter running (blower OFF)

BLOWER MOTOR LOCATION/TASK/DESIGN/FUNCTION - GF83.10-P-2170GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

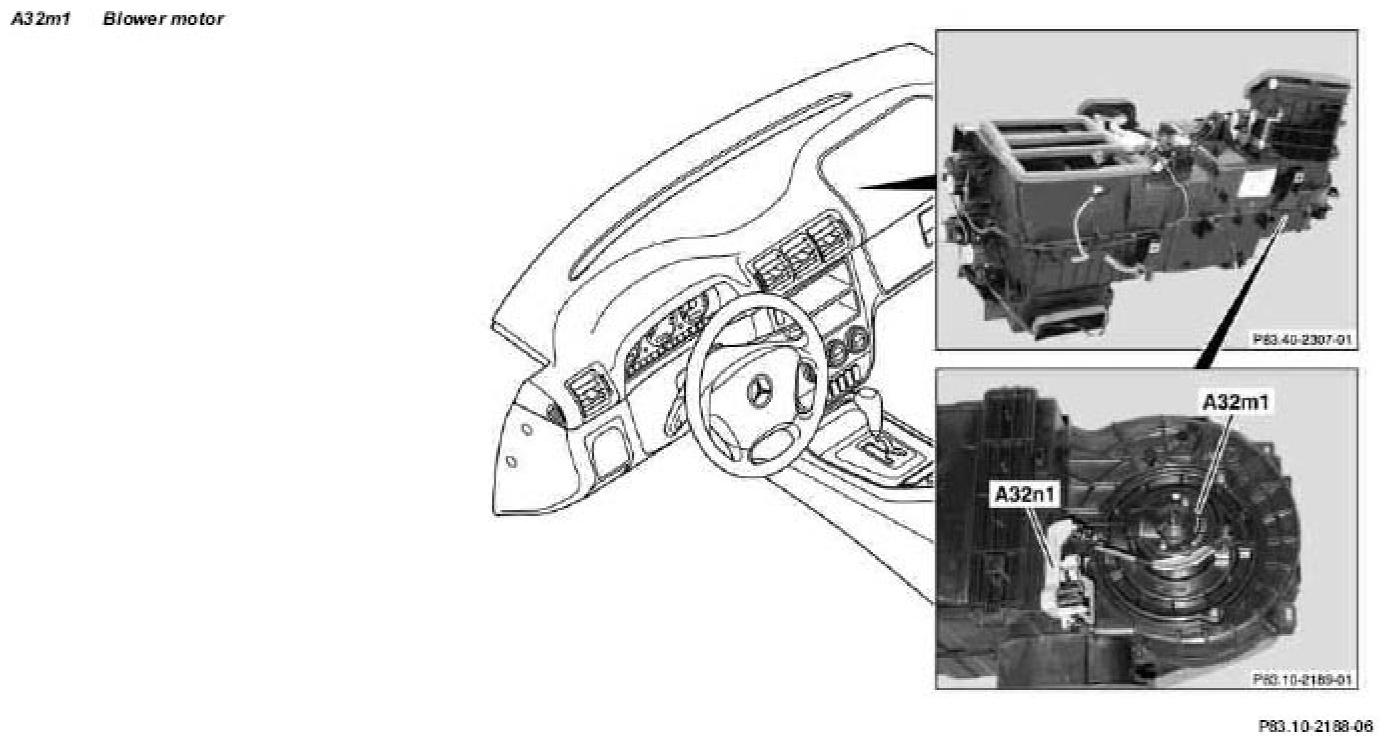


Fig. 27: Identifying Blower Motor

	Blower motor location	The blower motor (A32m1) is to the bottom right of the evaporator housing below the glove compartment.	
	Blower motor task	In fresh air mode the blower motor draws in fresh air via the fresh air/recirculating air flap. In recirculating air mode, air from the vehicle interior is drawn into the evaporator housing via the fresh air/recirculating air flap. When residual engine heat utilization is being used, the blower motor circulates the air around the interior.	
	Blower motor design	The blower motor is designed as a radial blower.	
	Blower motor function		**GF83.10-P-2170-01GI**

REAR SHUTOFF FLAP ACTUATOR MOTOR FUNCTION - GF83.10-P-2171-01GI

Function

Pressing the rear compartment air distribution button ( ) on the AAC push-button control module (N22) actuates the rear shutoff flap actuator motor (M12/2) via the AC bus. The rear shutoff flap actuator motor (M12/2) therefore controls the rear shutoff flap, which opens and controls the air supply to the rear blowout ducts.

NOTE: All actuator motors are identical.

If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After replacing an actuator motor an adjustment run must be performed via the Diagnosis Assistant System (DAS), i.e. the end positions flap OPEN and SHUT are defined and retained.

REAR SHUTOFF FLAP ACTUATOR MOTOR LOCATION/TASK/FUNCTION - GF83.10-P-2171GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

M2/12 Rear shutoff flap actuator motor

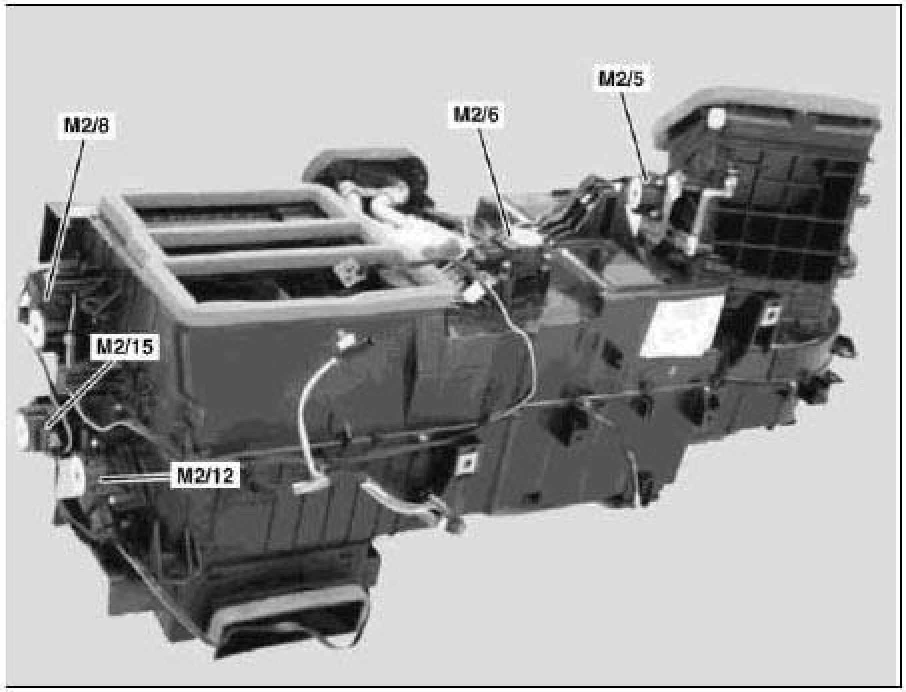


Fig. 28: Identifying Rear Shutoff Flap Actuator Motor

Rear shutoff flap actuator motor location	The rear shutoff flap actuator motor (M2/12) is to the left of the automatic air conditioning housing.	
Rear shutoff flap actuator motor task	The rear shutoff flap actuator motor (M2/12) operates the rear shutoff flap for controlling the flow of air to the rear compartment nozzle.	
Rear shutoff flap actuator motor function		GF83.10-P-2171-01GI

CENTER OUTLET FLAP ACTUATOR MOTOR - GF83.10-P-2172-01GI

Function

Rotating the air distribution switch in the AAC push-button control module (N22) actuates the center outlet flap actuator motor (M2/22) via the AC bus. The center outlet flap actuator motor (M2/22) controls the center outlet flap, which adopts the following positions according to requirements.

Switching logic

- center outlet flap closed = 0%
- center outlet flap open = 100%

Automatic center outlet flap control (Auto button engaged)

The center outlet flap is opened depending on the following values

- blending air flap setting
- Coolant temperature
- Evaporator temperature

linear up to 100 % open.

Center outlet flap control via push-button control module (Clock type switch setting of air distribution switch)

1 o'clock	**2 o'clock**	**3 o'clock**	**4 o'clock**	**5 o'clock**	**6 o'clock**
65%	82%	100%	68%	2%	0%
7 o'clock	**8 o'clock**	**9 o'clock**	**10 o'clock**	**11 o'clock**	**12 o'clock**
32%	**68%**	**100%**	**82%**	**65%**	**50%**

NOTE: All actuator motors are identical.

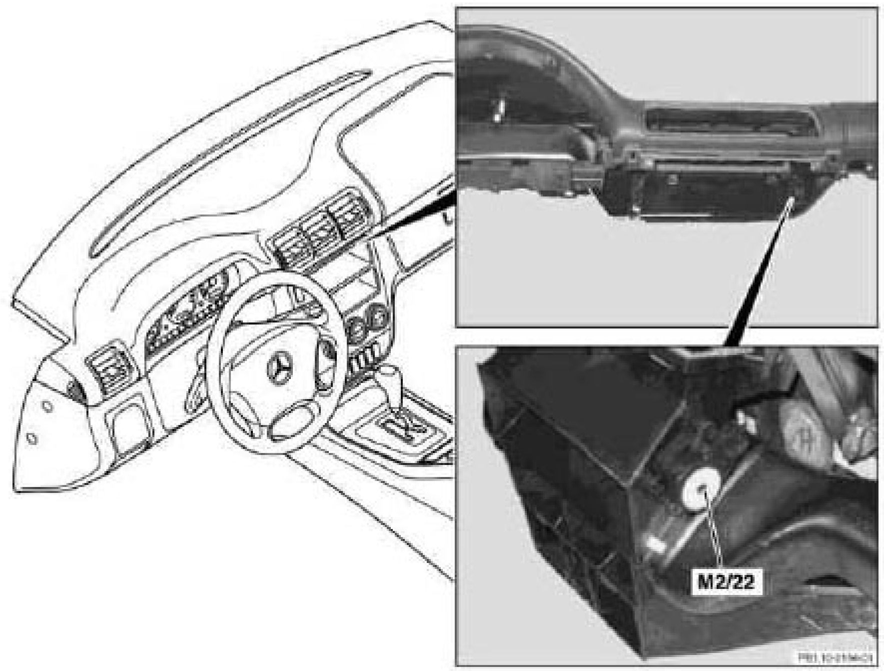
If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After replacing an actuator motor an adjustment run must be performed using the Diagnosis Assistant System (DAS), i.e. the flap OPEN and SHUT limit positions are defined and retained.

CENTER OUTLET FLAP ACTUATOR MOTOR, LOCATION/TASK/FUNCTION - GF83.10-P-2172GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

M2/22 Center outlet flap actuator motor



P83.10-2193-06

Fig. 29: Locating Center Outlet Flap Actuator Motor

Center outlet flap actuator motor location	The center outlet flap actuator motor (M2/22) is to the right of the center nozzle air duct, below the instrument panel.	
Center outlet flap actuator motor task	The center outlet flap actuator motor (M2/22) operates the center outlet flap for controlling the flow of air to the center nozzle.	
Center outlet flap actuator motor function		**GF83.10-P-2172-01GI**

REAR AIR DISTRIBUTION FLAP ACTUATOR MOTOR FUNCTION - GF83.10-P-2173-01GI

Function

Pressing the rear compartment air distribution button ( ) on the AAC push-button control module (N22) actuates the air distribution flap actuator motor (M2/21) via the AC bus. The air distribution flap actuator motor (M2/21) therefore controls the air distribution flap, which opens and controls the air supply to the rear blowout ducts.

NOTE: All actuator motors are identical.

If a problem exists, it is possible to retrieve and verify the defined end positions by means of the Diagnosis Assistant System (DAS) (valuation trip).

After replacing an actuator motor an adjustment run must be performed using the Diagnosis Assistant System

(DAS), i.e. the end positions flap OPEN and SHUT are defined and retained.

REAR AIR DISTRIBUTION FLAP ACTUATOR MOTOR, LOCATION/TASK/FUNCTION - GF83.10-P-2173GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

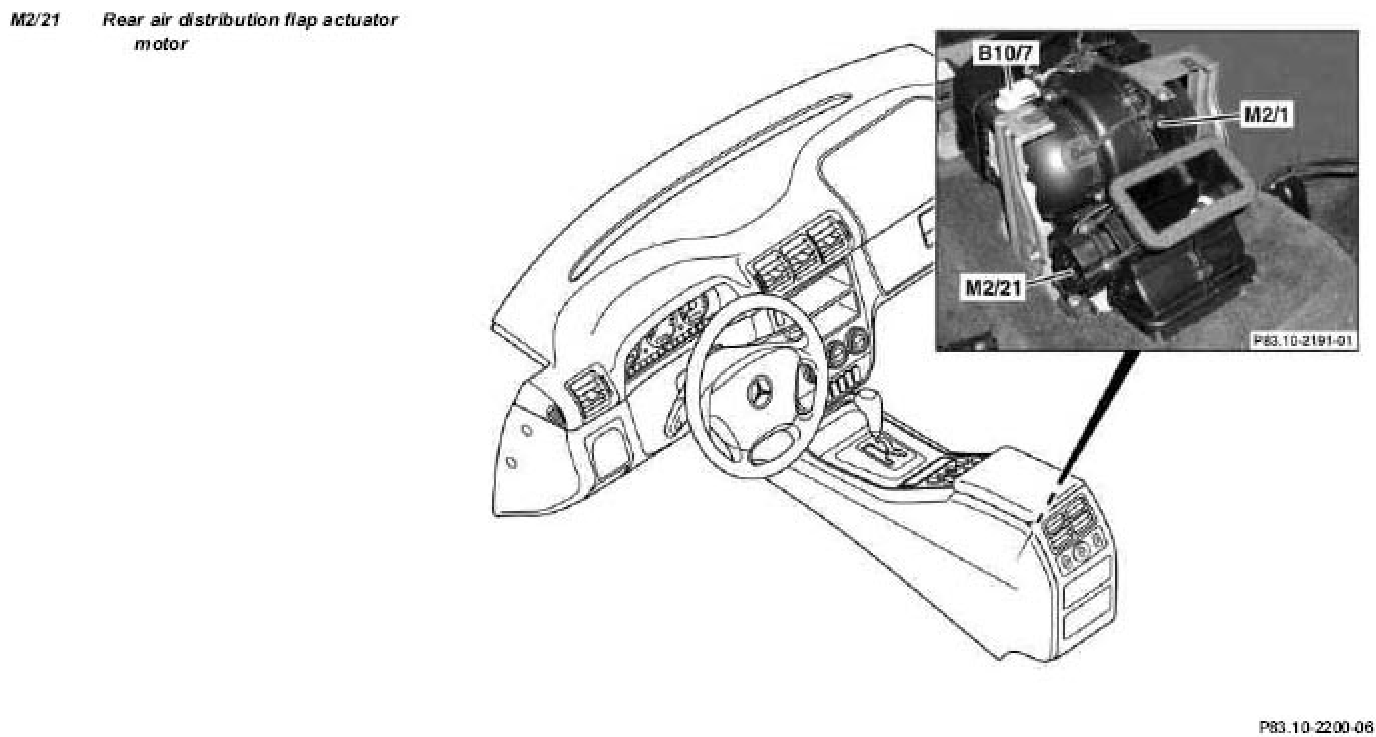


Fig. 30: Locating Rear Air Distribution Flap Actuator Motor

	Rear air distribution flap actuator motor location	The rear air distribution flap actuator motor (M2/21) is to the left of the rear blower housing, behind the rear compartment nozzle.	
	Rear air distribution flap actuator motor task	The rear air distribution flap actuator motor (M2/21) operates the rear air distribution flap for controlling the flow of air to the rear compartment nozzle and the rear footwell air vents.	
	Rear air distribution flap actuator motor function		**GF83.10-P-2173-01GI**

DEFROSTER VENT FLAP ACTUATOR MOTOR, FUNCTION - GF83.10-P-2175-01GI

Function

Pressing the defroster button ( ) on the AAC push-button control module actuates the defroster vent flap actuator motor (M2/8) via the air conditioner bus. The defroster vent flap actuator motor (M2/8) controls the defroster nozzle flaps, which adopt the following positions, according to requirements:

Defrost function

Defroster nozzle flap open 100 %.

System switched off

Defroster nozzle flap open 100 % (This limp-home capability ensures that the windshield will not fog up even when a malfunction has occurred)

Defroster nozzle flap control via the push-button control module

(Clock type switch setting of air distribution switch)

1 o'clock	**2 o'clock**	**3 o'clock**	**4 o'clock**	**5 o'clock**	**6 o'clock**
85%	68%	50%	32%	17%	0%
7 o'clock	**8 o'clock**	**9 o'clock**	**10 o'clock**	**11 o'clock**	**12 o'clock**
0 %	0 %	0 %	32 %	70 %	100 %

NOTE: All actuators are identical.

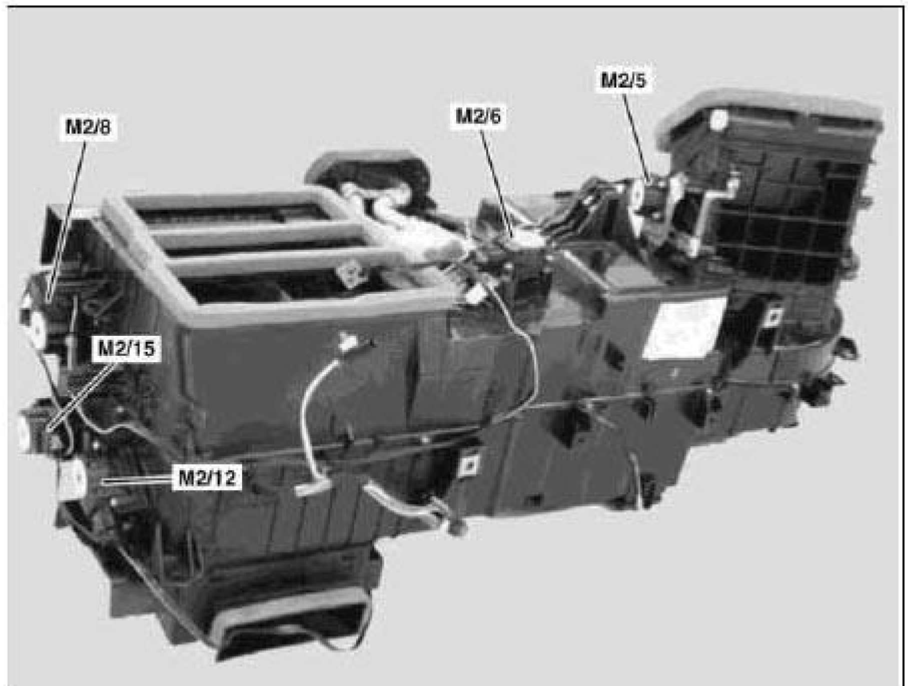
If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After replacement of an actuator motor it is necessary for an adjustment run to be performed using the diagnosis assistant system (DAS), i.e. the end positions flap OPEN and SHUT are defined and retained.

DEFROSTER VENT FLAP ACTUATOR MOTOR, LOCATION/TASK/FUNCTION - GF83.10-P-2175GI

Model 163 as of 1.9.01 with code (580a) Automatic air conditioning

M2/8 Defroster vent flap actuator motor



P83.10-2195-06

Fig. 31: Identifying Defroster Vent Flap Actuator Motor

	Defroster vent flap actuator motor, location	The defroster vent flap actuator motor (M2/8) is located at the left side of the air conditioner housing.	
	Defroster vent flap actuator motor, task	The defroster vent flap actuator motor (M2/8) operates the defroster vent flaps for air flow control to the windshield defroster vent and side window defroster vents.	
	Defroster vent flap actuator motor, function		**GF83.10-P-2175-01GI**

ELECTRONIC BLOWER CONTROL UNIT, REAR VENTILATION, FUNCTION - GF83.10-P-2176-01GI

Function

The blower push-button ( ) in the rear ventilation control panel (N72/2s3) is used to send a control voltage to the rear electronic blower regulator (N29/2). Depending on the control voltage (0 - 6 V) present, this then regulates the operating voltage (0 -12 V) for the rear blower motor (M2/1). This facilitates blower speed control of 0-100%.

Automatic operation, function

By pressing the Auto button (AUTO) in the rear ventilation control panel the control of the rear electronic blower regulator and thus that of the rear blower motor is governed by the AAC push-button control module.

REAR ELECTRONIC BLOWER REGULATOR, LOCATION/TASK/FUNCTION - GF83.10-P-2176GI

Model 163 as of 1.9.01 with code (580a) Automatic air conditioning

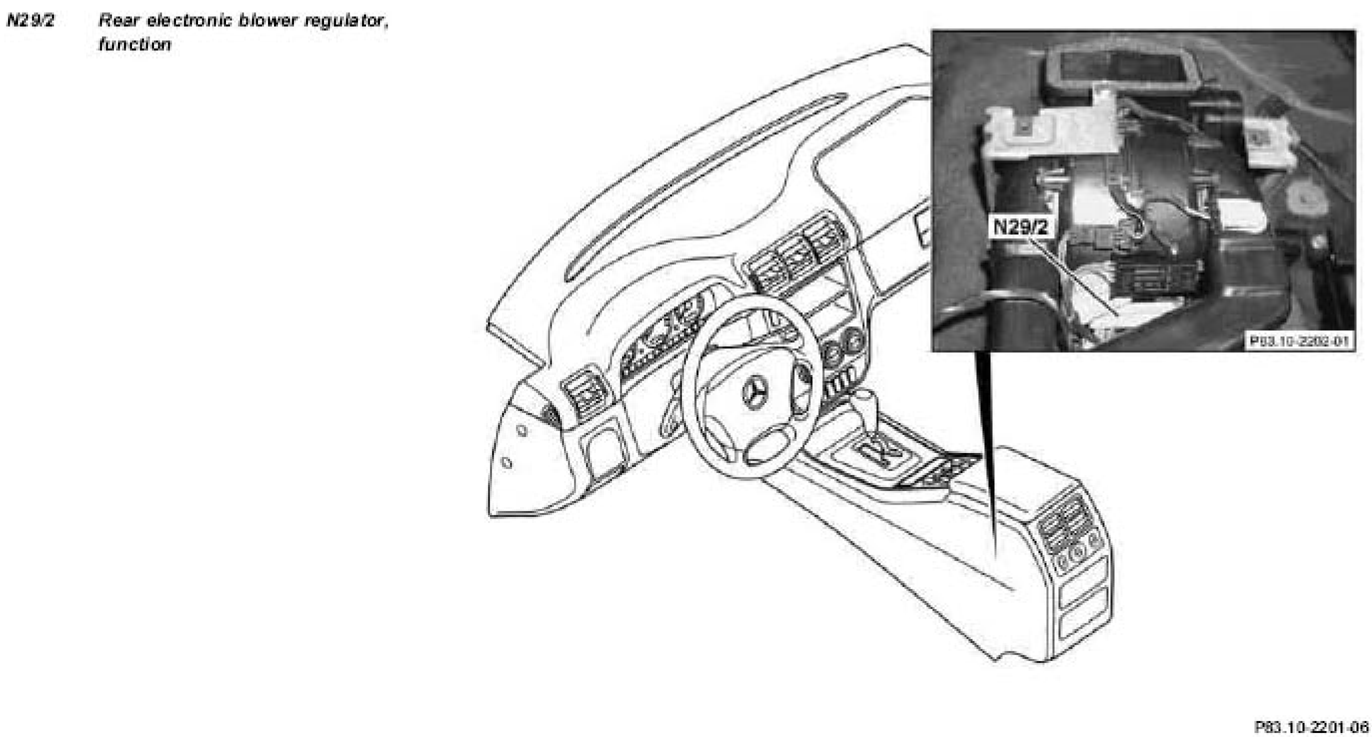


Fig. 32: Identifying Rear Electronic Blower Regulator

	Rear electronic blower regulator, location	The rear electronic blower regulator (N29/2) is located behind the rear nozzle below the center console.	
	Rear electronic blower regulator, task	The rear electronic blower regulator (N29/2) controls the rear blower motor (M2/1) voltage supply depending on the relevant blower level setting.	
	Rear electronic blower regulator, function		**GF83.10-P-2176-01GI**

HEATER FUNCTION - GF83.20-P-0002GH

MODEL 163 up to 31.8.01

Function

The heater enables a pleasant interior climate for the vehicle passengers in the event of different weather conditions.

A nominal temperature is preset at the heater push-button control module temperature selector wheel. This setting is transmitted to the blending air flaps in the heater housing via a cable and an actuation mechanism.

Control is then carried out there as follows:

Temperature selector wheel MAX setting (full heater output)

Due to the setting of the blending air flaps, the drawn in air is routed through the heat exchanger. Heated cooling water generally flows through this, as a result of which the passing air is heated. The temperature-controlled air is guided into the vehicle interior via the various air outlets.

Temperature selector wheel MIN setting (no heater output)

In this setting, the blending air flaps block the route to the heat exchanger. The drawn in fresh air is guided directly to the air outlets and therefore into the vehicle interior.

	Ventilation system function		**GF83.10-P-2000GH**
	Heater circuit function		**GF83.20-P-2003GH**
	Heater controls, function		**GF83.20-P-2004GH**

HEATER FUNCTIONAL DESCRIPTION TABLE OF CONTENTS - GF83.20-P-0998GH

MODEL 163 up to 31.8.01 except CODE (580) Air conditioning or Tempmatic for USA

	Heater function		**GF83.20-P-0002GH**
	Ventilation system function		**GF83.10-P-2000GH**
	Heater circuit function		**GF83.20-P-2003GH**
	Heater controls, function		**GF83.20-P-2004GH**
	Air inlet, location/function		**GF83.10-P-2138GC**
	Air ducts, location/task/design		**GF83.10-P-2139GH**
	Blower, location/task/design/function		**GF83.10-P-2102GC**
	Series resistor group, location/task/function		**GF83.10-P-2161GC**
	Dust filter, location/task/function		**GF83.10-P-2142GH**
	Rear vent, location/task/function		**GF83.10-P-2143GC**
	Defroster vent, location/task/function		**GF83.10-P-2144GC**
	Center nozzle, location/task/function		**GF83.10-P-2149GC**
	Lateral nozzle, location/task/function		**GF83.10-P-2150GC**
	Front footwell air outlet, location/task/function		**GF83.10-P-2145GC**
	Rear footwell air outlet, location/task/function		**GF83.10-P-2146GC**
	Heating system heat exchanger, location/ purpose/function		**GF83.20-P-2108GC**
	Fresh air/recirculated air flap, location/task/ function		**GF83.20-P-2111GC**
	Fresh air/recirculated air flap actuator, location/ task/function		**GF83.30-P-2116GC**
	Blower switch, location/task/design/function		**GF83.25-P-2100GC**
	Air distribution switch, location/task/design/ function		**GF83.25-P-2101GH**
	Temperature selector wheel, location/task/ design/function		**GF83.25-P-2102GC**
	Air recirculation switch, location/task/design/ function		**GF83.10-P-2117GH**

Heater housing position/task/function	GF83.20-P-2110GC

HEATER CIRCUIT FUNCTION - GF83.20-P-2003GH

MODEL 163

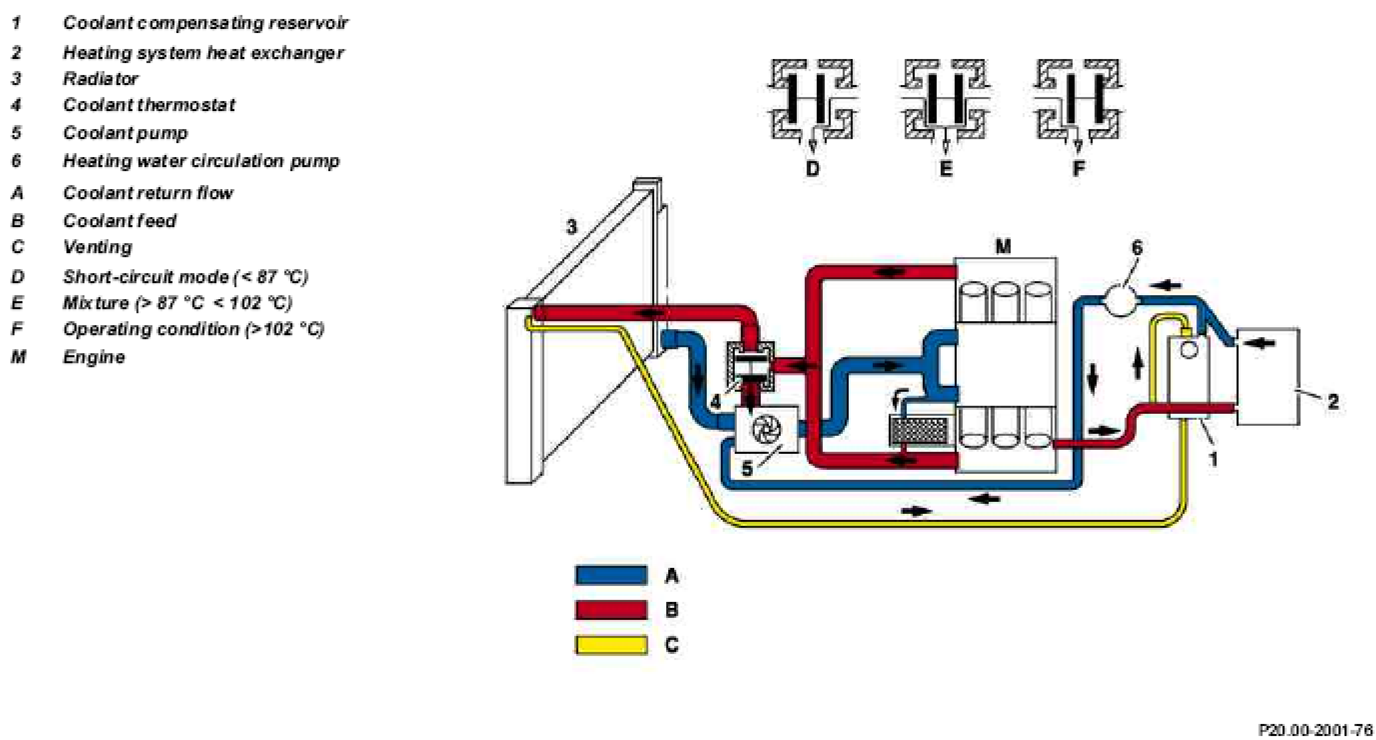


Fig. 33: Identifying Heater Circuit Function

Function

The coolant pump (5) pumps cold coolant through the engine. The coolant absorbs the engine's heat and becomes heated. The heated coolant is then conducted through the heat exchanger (2). The air blowing by the heat exchanger (2) is heated and conducted into the vehicle interior.

The coolant is routed over the coolant return (A) and the heating water circulation pump (6) back to the coolant pump (5).

By far the greater percentage of the coolant does not flow through the heat exchanger (2), but from the engine to the coolant thermostat (4). Depending on the water temperature, this conducts the water through the radiator (3) or directly to the coolant pump (5).

Heating system heat exchanger, location/ purpose/function		GF83.20-P-2108GC
Heater water circulation pump, location/task/ function	as of 1.09.01	GF83.20-P-2109GI

HEATER CONTROLS, FUNCTION - GF83.20-P-2004GH

Model 163 up to 31.8.01

The following components are integrated into the heater control unit (S98):

Blower switch (1): with 0 setting and 4 levels.

The blower switch (1) is not available as an individual part.

Temperature selector wheel (2): with the "Blue", non-heating setting and the continuously variable heater setting.

Air distribution switch (3): with the settings: Defroster vents, footwell, center plane and intermediate settings.

Recirculation switch ( ): Functions if diode is illuminated.

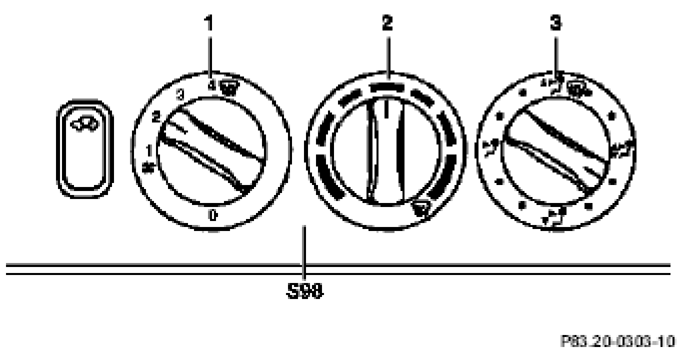


Fig. 34: Identifying Blower Switch, Selector Wheel And Air Distribution Switch On Heater Control Unit

	Description		Reference
	Blower switch, location/task/design/function		**GF83.25-P-2100GC**
	Air distribution switch, location/task/design/ function		**GF83.25-P-2101GH**
	Temperature selector wheel, location/task/ design/function		**GF83.25-P-2102GC**
	Air recirculation switch, location/task/design/ function		**GF83.10-P-2117GH**

HEATER CORE, FUNCTION - GF83.20-P-2101-01GC

Function

The heater coolant flows through the heater core. The heat is conducted to the outside by the aluminum tubes and fins.

This heats up the air flowing through on the way to the various defroster, vent and heater nozzles in the vehicle passenger compartment.

HEATING SYSTEM HEAT EXCHANGER, LOCATION - GF83.20-P-2101-02GH

The heater core (1) is located behind the instrument panel in the heater/ A/C housing.

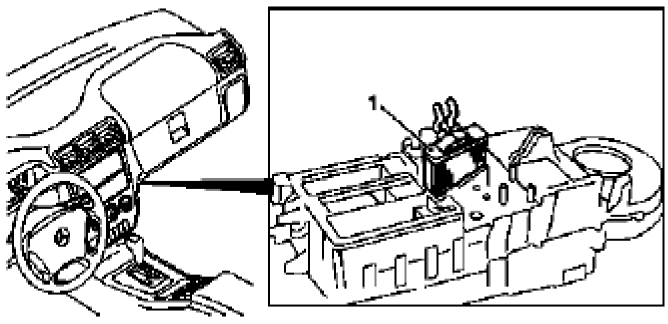


Fig. 35: Identifying Heater Core

HEATING WATER CIRCULATION PUMP FUNCTION - GF83.20-P-2102-01GI

Function

The quantity of coolant delivered to the heat exchanger when the engine is running is dependent on the coolant pump. The heating water circulation pump ensures that a constant and bubble-free flow of water is present at the heat exchanger during residual engine heat utilization, even at low engine speeds.

Initialization of the heating water circulation pump is carried out via the AAC push-button control module (N22).

Switch-on conditions

- Ignition ON
- Stationary heater/ON
- Enable conditions at residual engine heat complied with

Special conditions

At ambient temperatures of less than -20°C several starting attempts are made, in order to ensure that the heating water circulation pump goes into operation.

To this end the heating water circulation pump is switched off in intervals of 1 minute for 5 seconds, until the coolant or blow-out temperature is +20°C higher than the ambient temperature.

Switch-off conditions

- Ignition OFF and overshoot time expired
- Stationary heater OFF
- Residual engine heat OFF and overshoot time expired
- Enable conditions at residual engine heat no longer complied with

Enable conditions at residual engine heat

The heating water circulation pump runs in any event 1 minute after starting residual engine heat operation. The overshoot conditions at least will be fulfilled.

Overshoot conditions

Coolant temperature 100°C --> overshoot time 5 minutes

Coolant temperature >100°C --> overshoot time 10 minutes

HEATER HOUSING POSITION - GF83.20-P-2103-01GH

The heater housing (1) is located beneath the instrument panel.

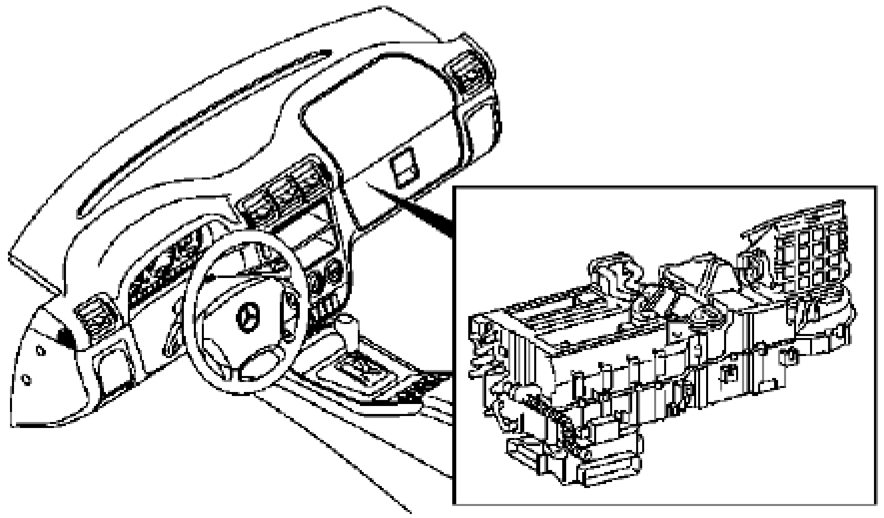


Fig. 36: Identifying Heater Housing

HEATER BOX FUNCTION - GF83.20-P-2103-02GH

Operating condition: Heating

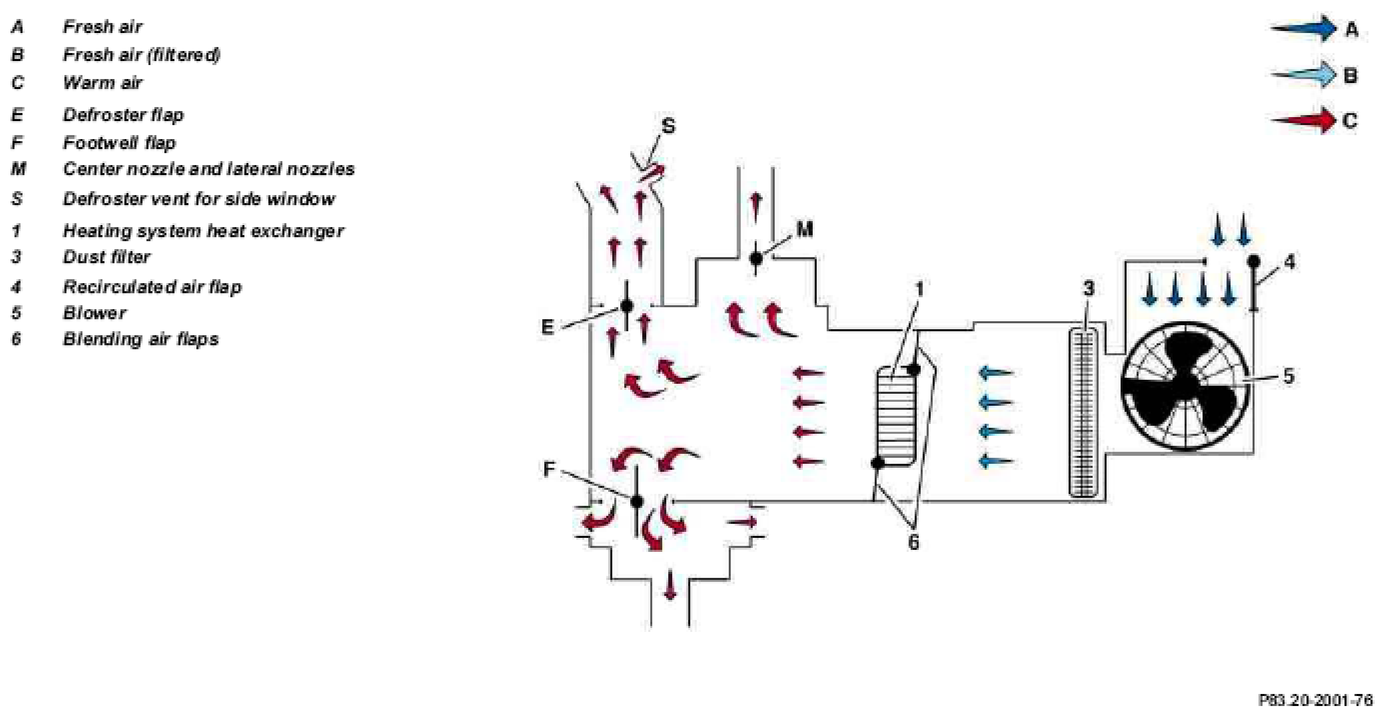


Fig. 37: Identifying Heater Box Function - Operating Condition Heating

Operating condition: Heating Function

In the heating operating status, the fresh air (A) is drawn in by the blower (5) into the heater housing and routed through the dust filter (3). The fresh air (B), which is cleaned by the dust filter (3), is subsequently conducted through the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The cleaned fresh air (B) is heated up by the heat exchanger (1). The warm air (C) is conducted via the air outlets (E, F, M and S) into the vehicle interior.

The recirculated air flap (4) is closed.

Operating condition: No heating

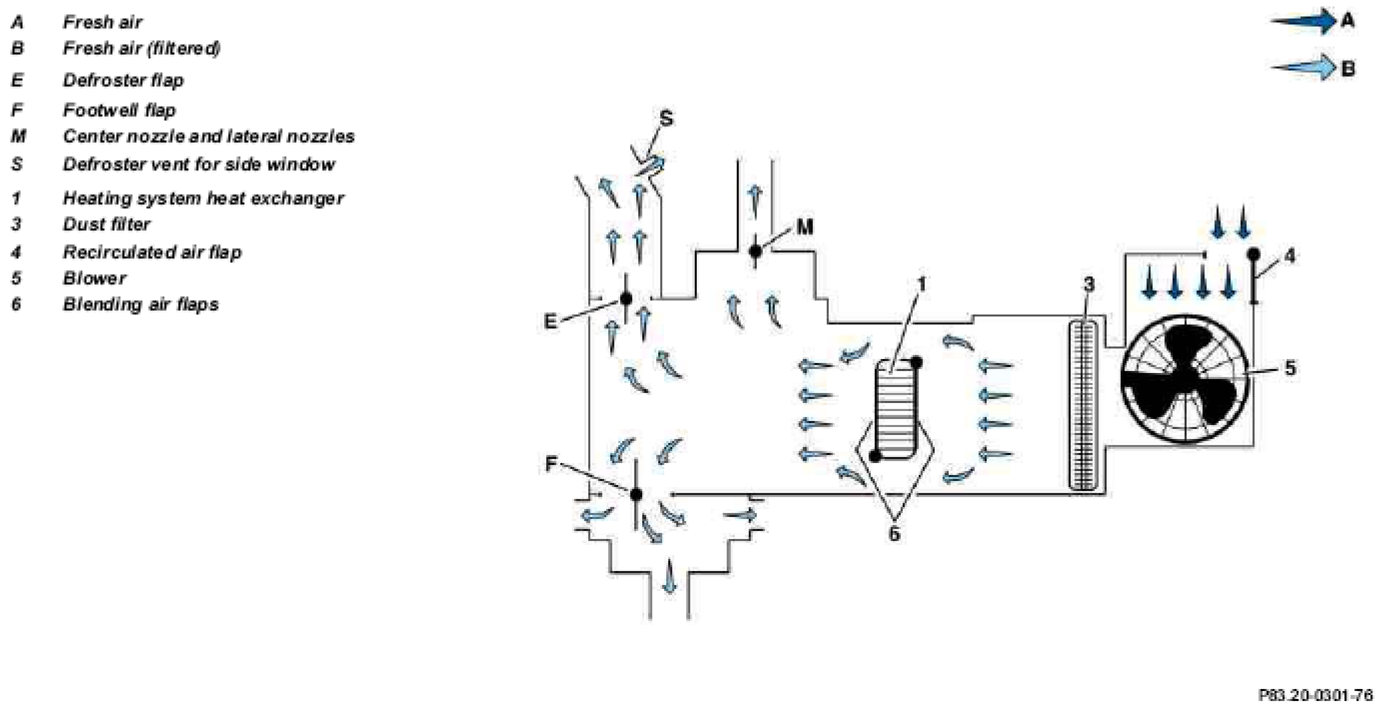


Fig. 38: Identifying Heater Box Function - Operating Condition No Heating

Operating condition: No heating Function

In the "no heating" operating status, the fresh air (A) is drawn in by the blower (5) into the heater housing and routed through the dust filter (3).

The fresh air (B), which is cleaned by the dust filter (3), is subsequently routed around the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The cleaned fresh air (B) is routed directly into the passenger compartment via the air outlets (E, F, M and S). The recirculated air flap (4) is closed.

Operating condition: No "recirculated air" heating

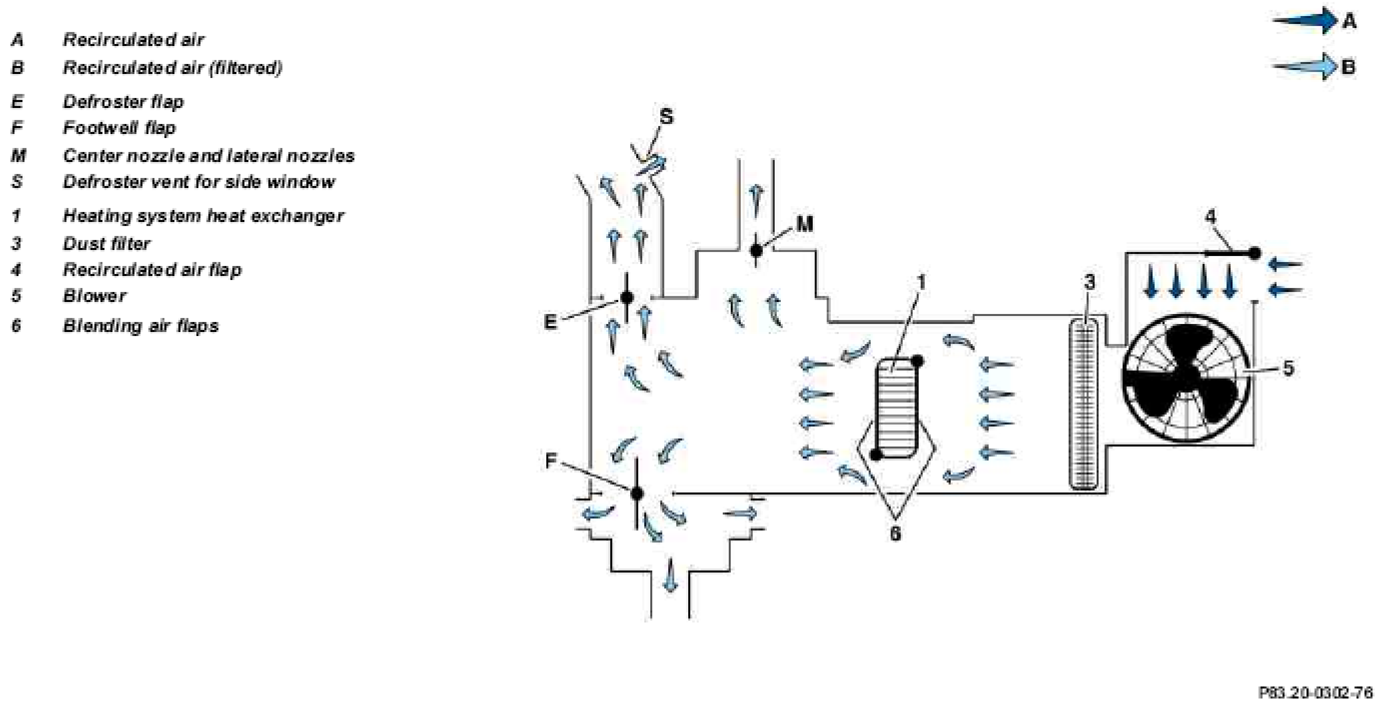


Fig. 39: Identifying Heater Box Function - Operating Condition No Recirculated Air Heating

Operating condition: No "recirculating air" heating Function

In the no "recirculated air" heating mode the blower (5) draws the recirculated air (A) from the passenger compartment over the opened recirculated air flaps (4) into the heater housing and routs it through the dust cleaner (3). The recirculated air (B), which is cleaned by the dust filter (3), is subsequently routed around the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The cleaned recirculated air (B) is routed directly into the passenger compartment via the air outlets (E, F, M and S).

The supply of fresh air is cut off by the recirculated air flap (4).

HEATER HOUSING TASK - GF83.20-P-2103-03GC

The heater housing serves to house the following components

- Air ducting flaps
- Dust filter
- Blower
- Series resistor group
- Heating system heat exchanger
- PTC heater booster (in model 168 with engines OM 668.940/941 as of 01.03.01)
- Fresh air/recirculated air flap actuator (with model 168 as of 01.03.01)

and therefore forms a complete unit.

The heater housing distributes the air which is required to ventilate the vehicle interior to the relevant air ducts and air outlets depending on the temperature desired in the interior.

The air ducting depends on various operating conditions such as:

- Heating
- No heating
- Fresh air mode
- Recirculated air mode

FRESH AIR/RECIRCULATED AIR FLAP, LOCATION - GF83.20-P-2104-01GH

The fresh air/recirculated air flap (1) is located at the top of the heater/A/C housing.

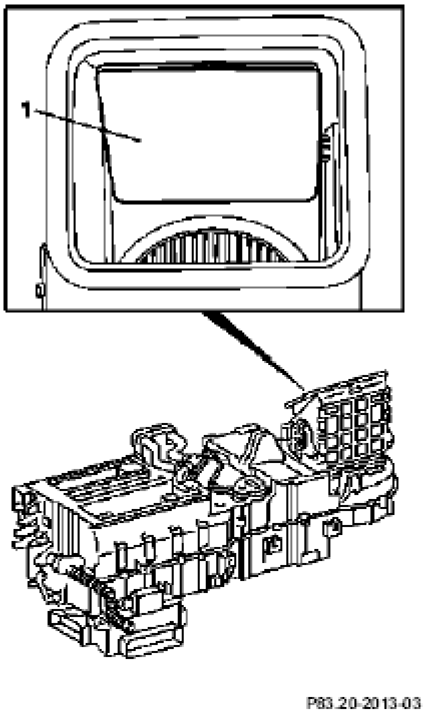


Fig. 40: Identifying Fresh Air/Recirculated Air Flap

FRESH AIR/RECIRCULATED AIR FLAP, FUNCTION - GF83.20-P-2104-02GH

Function

The fresh air/recirculated air flap is actuated by the fresh air/ recirculated air flap actuator (M2/5).

Fresh air mode

The fresh air/recirculated air flap shuts off the supply of recirculated air.

Fresh air is drawn in.

Recirculation mode

The fresh air/recirculated air flap shuts off the supply of fresh air. Air is drawn in from the passenger compartment.

HEATER CORE, LOCATION/PURPOSE/FUNCTION - GF83.20-P-2108GC

MODEL 163, 168

	Heater core, location	Model 168 Model 163	GF83.20-P-2101-02GC **GF83.20-P-2101-02GH**
	Heater core, purpose	The heater core serves for heating up the air flowing through on the way to the various defroster, ventilation and heating nozzles in the vehicle passenger compartment.	
	Heater core, function		**GF83.20-P-2101-01GC**

HEATING WATER CIRCULATION PUMP, LOCATION/TASK/FUNCTION - GF83.20-P-2109GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

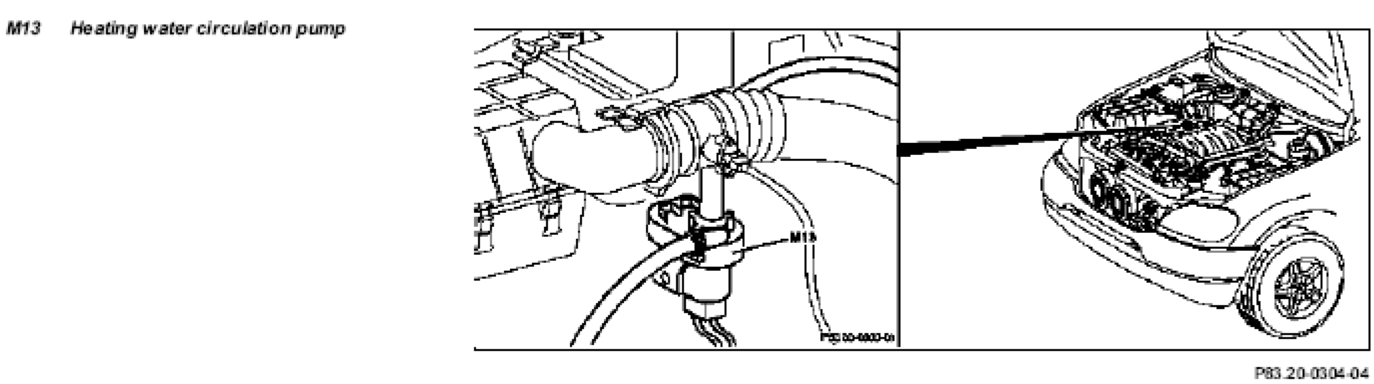


Fig. 41: Identifying Heating Water Circulation Pump

	Heating water circulation pump, position	The heating water circulation pump (M13) is located at the front right in the engine compartment next to the coolant compensating reservoir.	
	Heating water circulation pump task	The heating water circulation pump (M13) serves to maintain a constant flow of hot water through the heat exchanger in the event of low engine speeds and residual engine heat utilization.	

Heating water circulation pump function		**GF83.20-P-2102-01GI**

HEATER HOUSING POSITION/TASK/FUNCTION - GF83.20-P-2110GC

MODEL 163 up to 31.8.01

168 up to except CODE (580) Air conditioning or Tempmatic for USA

Shown on model 168 as of 1.03.01

1 Heater housing

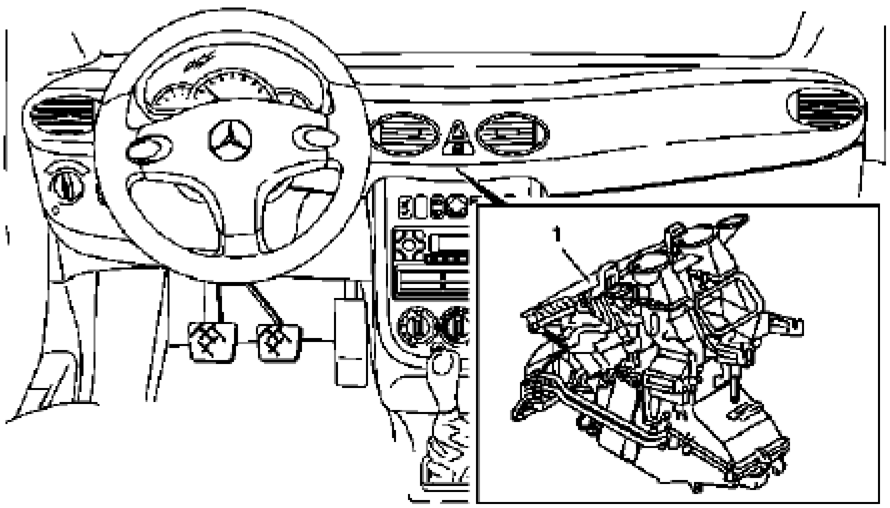


Fig. 42: Identifying Heater Housing - Shown On Model 168 As Of 1.03.01

Heater housing position	The heater housing (1) is located beneath the instrument panel. Model 168 up to 28.02.01 Model 163	 GF83.20-P-2103-01GC **GF83.20-P-2103-01GH**
Heater housing task		**GF83.20-P-2103-03GC**
Heater housing function	Model 168 Model 163	GF83.20-P-2103-02GC **GF83.20-P-2103-02GH**

FRESH AIR/RECIRCULATED AIR FLAP, LOCATION/PURPOSE/FUNCTION - GF83.20-P-2111GC

MODEL 163, 168

Fresh air/recirculated air flap, location	Model 168	GF83.20-P-2104-01GC
	Model 163	**GF83.20-P-2104-01GH**
Fresh air/recirculated air flap, purpose	The fresh air/recirculated air flap switches the system over from fresh air to recirculated air.	
Fresh air/recirculated air flap, function	Model 168	GF83.20-P-2104-02GC
	Model 163	**GF83.20-P-2104-02GH**

BLOWER SWITCH, LOCATION - GF83.25-P-2100-01GH

Heater depiction

The blower switch (1) is located in the heater control unit.

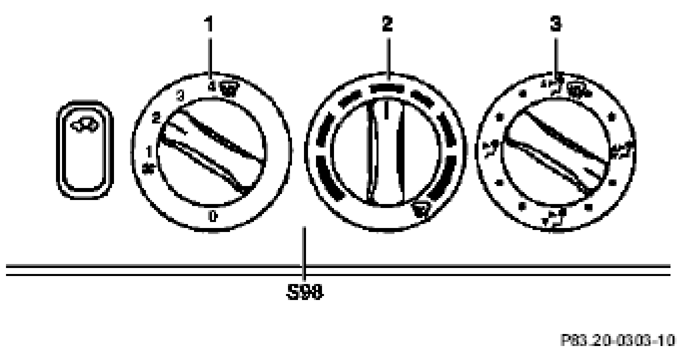


Fig. 43: Identifying Blower Switch On Heater Control Unit

BLOWER SWITCH, FUNCTION - GF83.25-P-2100-02GC

Function

Depending on the setting of the blower switch, the current is guided via sliding contacts onto a contact plate, and from there to the relevant series resistor assembly resistor for the set blower level.

On actuation of the starter, the control voltage for the blower (M2) is switched off at the control unit via terminal 15x.

Model 168 as of 1.03.01

Blower level 4 is implemented by bridging two contact decks.

As a result of the design of the contact plate, the re-activation of

blower level 1 --> blower level 2 and

blower level 2 --> blower level 3

may lead to an increase in the speed of the blower motor due to the short-term bridging of two contact plates (intermediate setting).

BLOWER SWITCH, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2100GC

MODEL 163 up to 31.8.01 168

Shown on model 168 with heating as of 01.03.01

N119s3 Blower switch

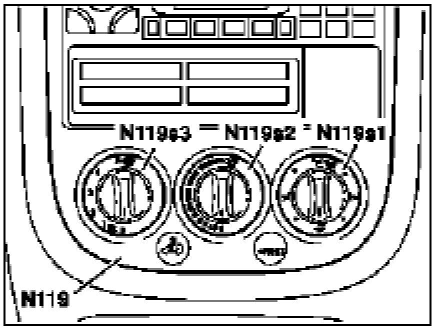


Fig. 44: Identifying Blower Switch (Model 168 With Heating As Of 01.03.01)

Item	Description	Reference
Blower switch, location	The blower switch (N119s3) is located on the left in the heater push-button control module. Model 168 up to 28.02.01 Model 163	GF83.25-P-2100-01GC **GF83.25-P-2100-01GH**
Blower switch, task	The blower switch activates several blower stages in fresh air and recirculating air mode.	
Blower switch design	The blower switch is designed as a multi-level rotary switch with an axis and wiper contact.	
Blower switch, function		**GF83.25-P-2100-02GC**

BLOWER SWITCH, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2100GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

1 Blower switch

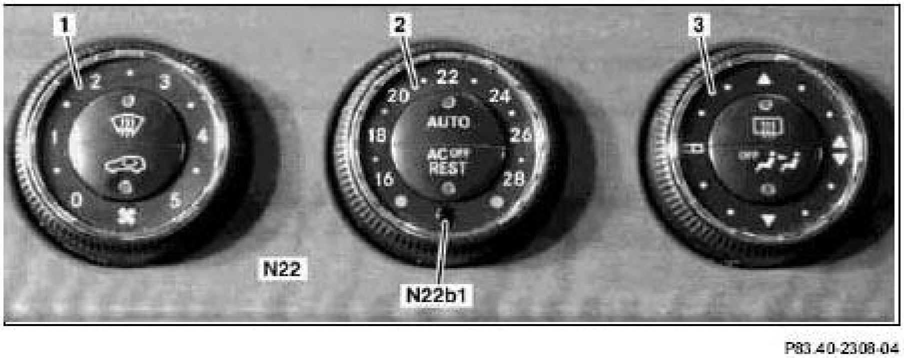


Fig. 45: Identifying Blower Switch - Model 163 As Of 1.9.01 With Code (580a Automatic Air Conditioning

Blower switch, location	The blower switch (1) is located on left in the AAC push-button control module (N22).
Blower switch, task	The blower switch (1) activates several blower stages in fresh air and recirculating air mode.
Blower switch design	The blower switch (1) is equipped with a rotary ring with which the blower levels can be set. The LEDs in the rotary ring display the set blower level.
Blower switch, function	The blower switch (1) sets the control voltage for the blower regulator in 6 stages and 5 intermediate settings via the push-button control module, depending on the setting. This facilitates blower speed control of 0 -100 %.

AIR DISTRIBUTION SWITCH, FUNCTION - GF83.25-P-2101-01GH

Function

Turning the air distribution switch causes two wire cables to move the air distribution flaps, in order to route air through the air distribution system to the air vents. The air vents are:

- defroster vents for windshield/side windows
- center air vents
- lower air vents

There are 12 possible indented positions for air distribution.

AIR DISTRIBUTION SWITCH, FUNCTION - GF83.25-P-2101-01GI

Function

The air distribution can be set manually or automatically:

- Manual
  - Turning the air distribution switch

- Automatic
  - Pressing the Auto button (AUTO)

Turning the air distribution switch on the AAC push-button control module (N22) actuates the various air distribution actuators via air conditioner bus.

The following basic settings for air distribution are provided:

- Air flow from center and side vents
- Air flow at center, side,

  footwell and defroster vents

- Air outlet at the center, side and defroster vents
- Air flow at center, side and footwell vents

Apart from the 4 listed basic settings, a further 8 intermediate settings can be selected.

AIR DISTRIBUTION SWITCH, LOCATION - GF83.25-P-2101-02GH

Heater depiction

The air distribution switch (3) is located in the heater control unit (S98).

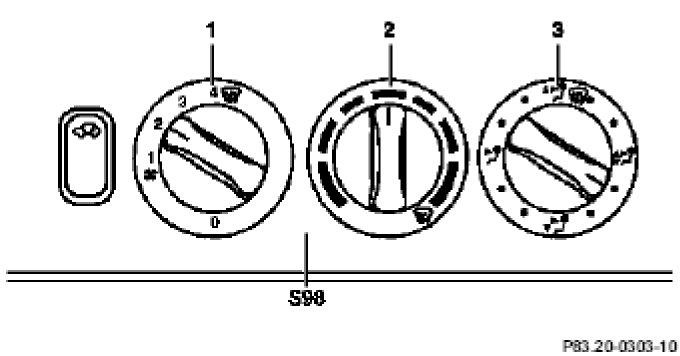


Fig. 46: Identifying Air Distribution Switch

AIR DISTRIBUTION SWITCH, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2101GH

MODEL 163 up to 31.8.01

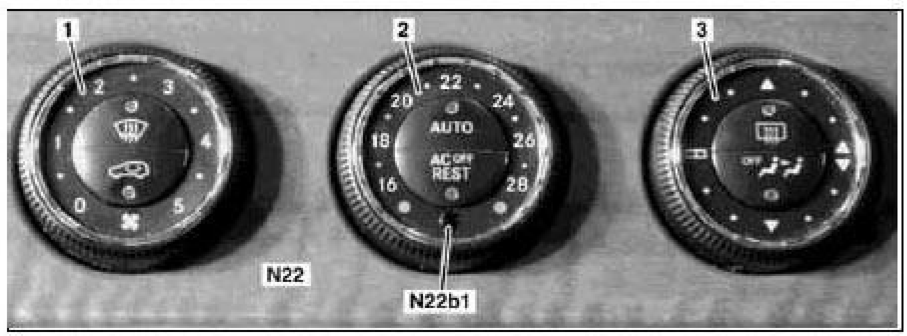
Air distribution switch, location		**GF83.25-P-2101-02GH**
Air distribution switch, task	The air distribution switch regulates the flow of air through the air distribution system to the air vents for ventilation of the passenger compartment.	

Air distribution switch, design	The air distribution switch is designed as a rotary switch with 12 indented positions for air distribution.	
Air distribution switch, function		**GF83.25-P-2101-01GH**

AIR DISTRIBUTION SWITCH, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2101GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

Air distribution switch



P83.40-2308-04

Fig. 47: Identifying Air Distribution Switch - Model 163 As Of 1.9.01 With Code (580a) Automatic Air Conditioning

Air distribution switch, location	The air distribution switch (3) is located on the right in the AAC push-button control module (N22).	
Air distribution switch, task	The air distribution switch (3) controls the air flow to the air outlets for ventilation of the passenger compartment.	
Air distribution switch, design	The air distribution switch (3) is equipped with a rotary ring, with which the air distribution can be set. The LEDs in the rotary ring display the air distribution level.	
Air distribution switch, function		**GF83.25-P-2101-01GI**

TEMPERATURE SELECTOR WHEEL, FUNCTION - GF83.25-P-2102-01GH

Function

Heating

By rotating the temperature selector wheel, a cable is moved via a disk cam, thereby actuating the blending air flaps.

Air conditioning

The air temperature is regulated by a rotary control with a variable resistor. Signals from the resistor and AAC control module determine the desired interior temperature. If the temperature selector wheel is turned in an anti-

clockwise direction to the final indented position (max. cooling), the recirculation switch is bypassed and thus the fresh air flaps closed, in order to achieve the max. interior cooling (with A/C ON).

TEMPERATURE SELECTOR WHEEL, FUNCTION - GF83.25-P-2102-01GI

Function

The desired in-car temperature is set by turning the temperature selector wheel on the AAC push-button control module (N22).

The AAC push-button control module (N22) compares the desired temperature with the temperature in the passenger compartment. The passenger compartment temperature is determined by the in-car temperature sensor on the AAC push-button control module (N22) and the temperature sensor for the vent air at the center nozzle, front and rear footwells.

Using the comparison between specified and actual values, the AAC push-button control module (N22) determines the correct setting of the blending air flaps and actuates these. The selected temperature is reached and maintained as quickly as possible, if warming or cooling of the interior is necessary.

TEMPERATURE SELECTOR WHEEL, LOCATION - GF83.25-P-2102-02GH

Heater depiction

The temperature selector wheel (2) is located in the heater control unit.

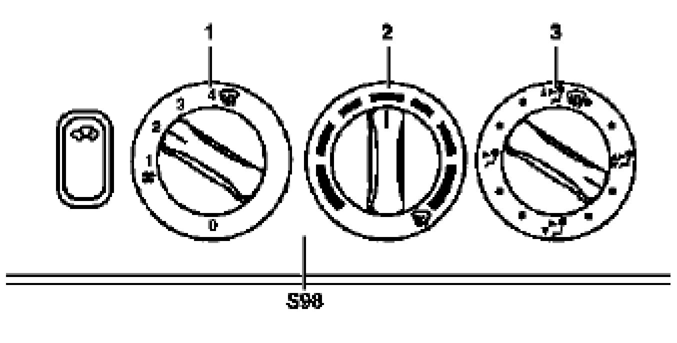


Fig. 48: Identifying Temperature Selector Wheel On Heater Control Unit - Model 163

TEMPERATURE SELECTOR WHEEL, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2102GC

MODELS 163 up to 31.8.01, 168 up to 28.2.01

Temperature selector wheel, location	Model 168 Model 163	GF83.25-P-2102-02GC **GF83.25-P-2102-02GH**
Temperature selector	The temperature selector wheel serves to preselect the	

	wheel, task	temperature desired in the vehicle interior.	
	Temperature selector wheel design	**Heater:** Rotary switch with disk cam, pivot, control-sleeve levers, as well as micro stops and end stops Air conditioning Rotary switch with potentiometer	
	Temperature selector wheel, function	Model 168 Model 163	GF83.25-P-2102-01GC **GF83.25-P-2102-01GH**

TEMPERATURE SELECTOR WHEEL, LOCATION/TASK/DESIGN/FUNCTION - GF83.25-P-2102GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

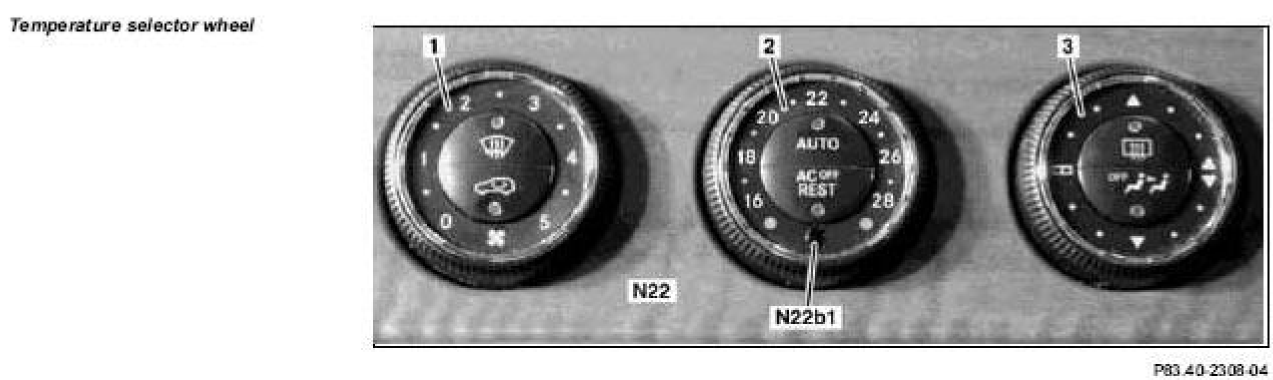


Fig. 49: Identifying Temperature Selector Wheel - Model 163 As Of 1.9.01 With Code (580a) Automatic Air Conditioning

	Temperature selector wheel, location	The temperature selector wheel (2) is located in the center in the AAC push-button control module (N22).	
	Temperature selector wheel, task	The temperature selector wheel (2) serves to preselect the temperature desired in the vehicle interior.	
	Temperature selector wheel design	The temperature selector wheel (2) is equipped with a rotary ring, with which the temperature values can be set. The LEDs in the rotary ring display the set temperature level.	
	Temperature selector wheel, function		**GF83.25-P-2102-01GI**

AIR CONDITIONING (TAC) FUNCTION - GF83.30-P-0001GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

Function

The air conditioning's electronically controlled cooling, heating and ventilation system keeps the desired in-car temperature constant. AC button (Danger!) pressed (illuminates).

After starting, the refrigerant compressor starts up. If cooling is not necessary, the refrigerant compressor's output is lowered and switched off via the icing inhibitor.

The air conditioning is always ready for operation after the engine has been started, and operates according to the so-called "reheat" principle. This means: The refrigerant compressor always operates at an ambient temperature in excess of 1°C, therefore also cools cold incoming air. Following the cooling process, the dried air is heated at the heat exchanger.

On the one hand, this effect serves the purpose of comfort, because cooling also simultaneously causes air dehumidification which, in turn, is an important prerequisite for a pleasant interior climate. On the other hand, the air is dried as a result of this cooling and heating, thereby preventing window fogging.

Pressing the AC button again (⚠ Danger!) (does not illuminate) switches off the cooling.

Heating mode

The in-car temperature sensor measures the air temperature in the interior of the vehicle.

The air conditioning control module electronics compares the in-car temperature with the desired temperature which has been set at the temperature selector wheels.

The microprocessor adjusts the air conditioning electronics or keeps the relevant setting constant as required.

Heater operation with heater booster in vehicles with engine 612.963 as of 12/99

In vehicles equipped with direct-injection diesel engines, an electrical heater booster is additionally installed in the evaporator housing downstream of the heat exchanger, in order to compensate any heater output deficit which exists under certain operating conditions.

The 3 heating elements in the heater booster are supplied with current, whereupon they are heated and they start to glow. As a result of the structural conditions, it is ensured that the drawn in fresh air flows directly past the electric heater booster, and is therefore heated.

Cooling mode

The icing inhibitor measures the temperature at the evaporator air outlet, while the interior temperature sensor determines the relevant in-car temperature.

The air conditioning control module electronics compares the various measured values with the desired temperature which has been set at the temperature selector wheels.

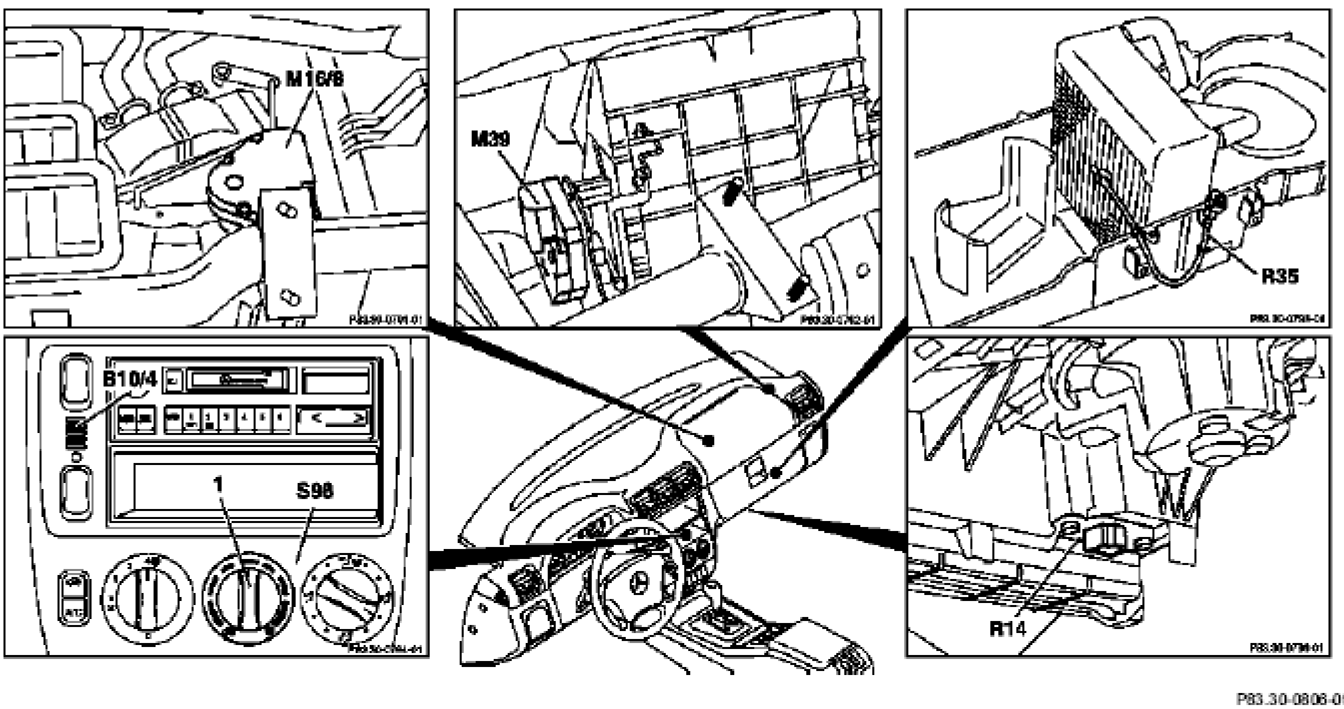
The microprocessor adjusts the air conditioning or keeps the relevant setting constant as required.

BT	In-car temperature sensor replaced by new type	as of 1.12.99	BT83.57-P-0001-04GH
	Ventilation, function		**GF83.10-P-2000GH**
	Heater circuit function		**GF83.20-P-2003GH**

	Air conditioning control module function		**GF83.30-P-2001GH**
	Refrigerant circuit function		**GF83.40-P-2001GH**
	Temperature control, function		**GF83.57-P-2000GH**
	Heater booster (ZUH), function	Engine 612.963	GF83.70-P-0005GH

AIR CONDITIONING, LOCATION OF COMPONENTS - GF83.30-P-0003-01GH

Location of components in passenger compartment



1	*Temperature selector wheel*
B10/4	*In-car temperature sensor with aspirator blower*
M16/8	*Blending air flap actuator motor*
M39	*Fresh and recirculated air actuator*
R14	*Blower motor series resistor group*
R35	*Icing protection temperature sensor*
S98	*Heating/AAC switch*

Fig. 50: Identifying Air Conditioning Components In Passenger Compartment (1 Of 2)

Location of components in passenger compartment

1	Heater / AAC switch
2	Cover
3	AC housing
4	Screw
5	Plug connection
N19	AAC control unit

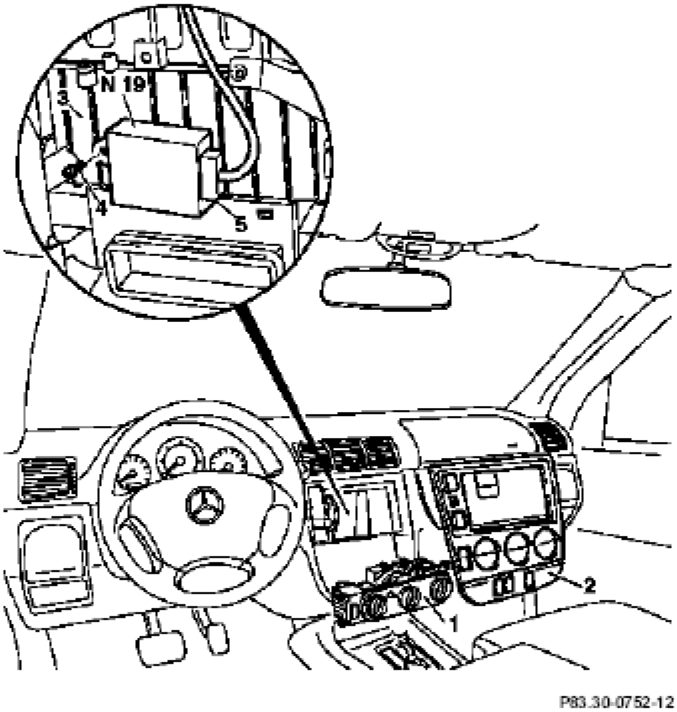


Fig. 51: Identifying Air Conditioning Components In Passenger Compartment (2 Of 2)

Location of components in passenger compartment as of 12/99

M9	In-car temperature sensor aspirator blower
B10/5	Outside temperature sensor
B10/5x1	Outside temperature sensor connector

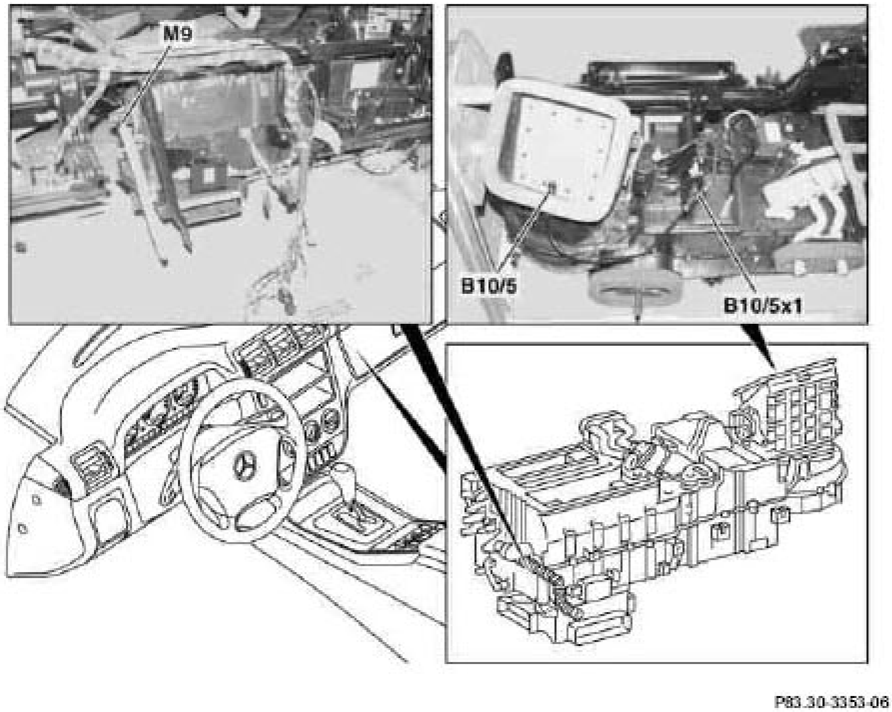


Fig. 52: Identifying Air Conditioning Components - Location Of Components In Passenger

Compartment As Of 12/99

Location of components in engine compartment

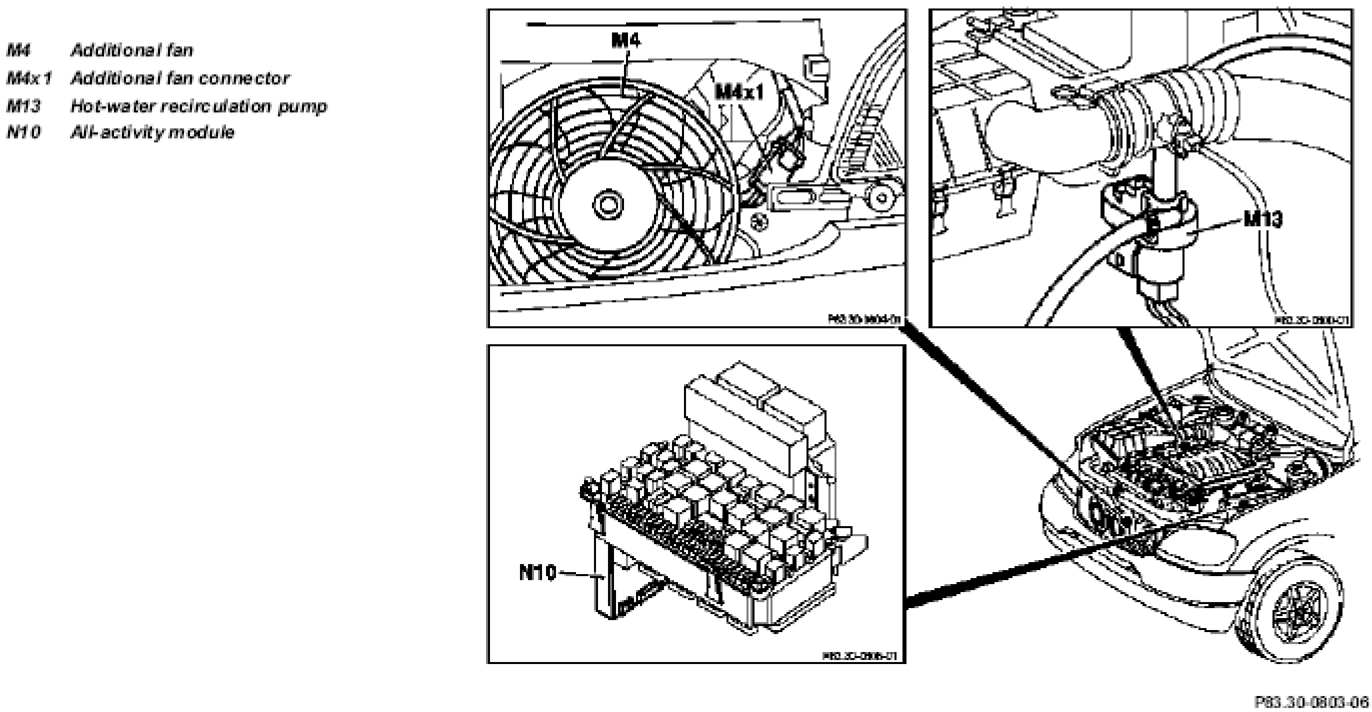
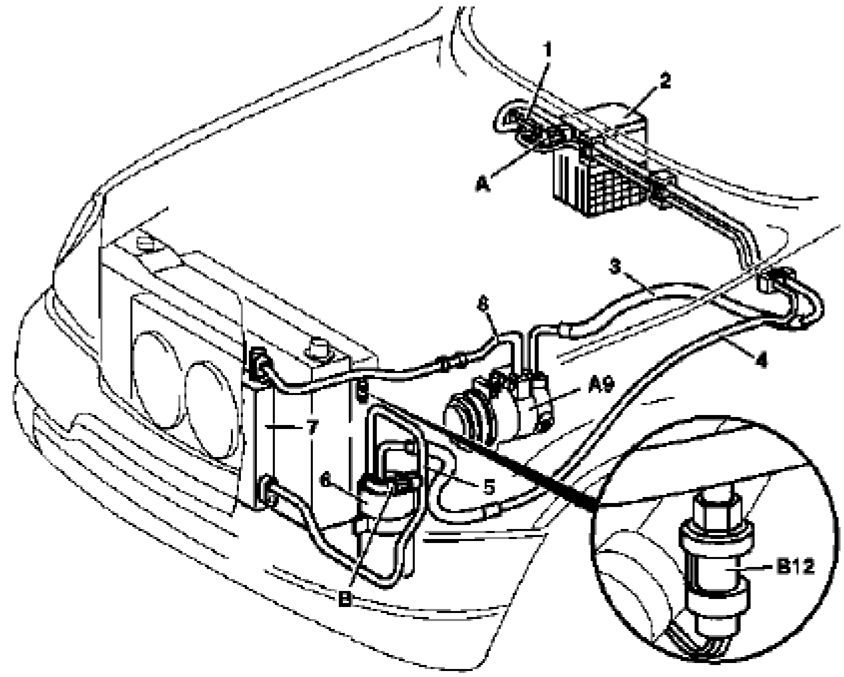


Fig. 53: Identifying Air Conditioning Components - Location Of Components In Engine Compartment

Location of components, refrigeration technology part up to 11/99

1	Expansion valve
2	Evaporator
3	Suction pipe
4	Pressure line
5	Pressure line
6	Fluid reservoir
7	Capacitor
8	Pressure line
A	Manifold air pressure connection
B	High pressure connection
A9	AC compressor
B12	Refrigerant pressure sensor

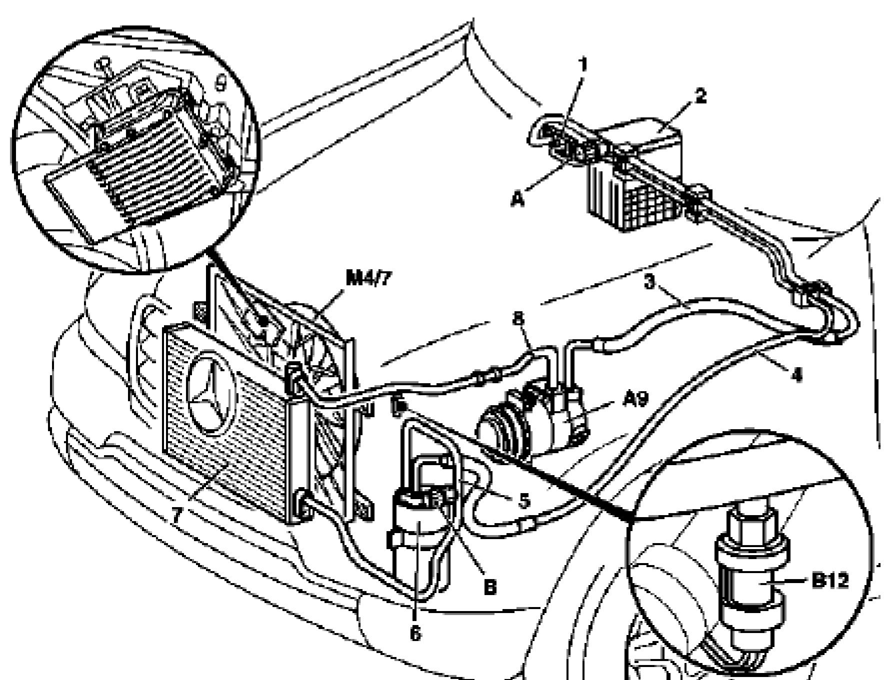


P83.30-0784-06

Fig. 54: Identifying Refrigeration Components - Refrigeration Technology Part Up To 11/99)

Location of components, refrigeration technology part up to 12/99

1	Expansion valve
2	Evaporator
3	Suction pipe
4	Pressure line
5	Pressure line
6	Fluid reservoir
7	Capacitor
8	Pressure line
A	Manifold air pressure connection
B	High pressure connection
A9	AC compressor
B12	Refrigerant pressure sensor
M4/7	Electric suction fan engine and AC with integrated control
N76	Engine and air conditioning electric suction fan control unit



P83.30-3356-06

Fig. 55: Identifying Refrigeration Components - Refrigeration Technology Part Up To 12/99

TABLE OF CONTENTS, AIR CONDITIONING (TAC) FUNCTION DESCRIPTION - GF83.30-P-0999GH

MODEL 163 up to 31.8.01 with code (580) Air conditioning or Tempmatic for USA

AIR CONDITIONING CONTROL MODULE FUNCTION - GF83.30-P-2001GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

The following components are integrated into the air conditioning control module (S98):

Blower switch (1): with 0 setting and 4 levels.

The blower switch (1) is not available as an individual part.

Temperature selector wheel (2): with the "Blue", non-heating setting and the continuously variable heater setting.

When set to the indented position "blue" 100 % recirculated air is provided.

Air distribution switch (3): with the settings: Defroster vents, footwell, center plane and intermediate settings.

Recirculation switch ( ) : 100 % recirculation without time limit, when diode illuminates.

AC button (Danger!): Diode illuminates,

Refrigerant compressor **ON** cooling mode/air dehumidification Diode is not illuminated, refrigerant compressor **OFF** no air dehumidification/cooling mode

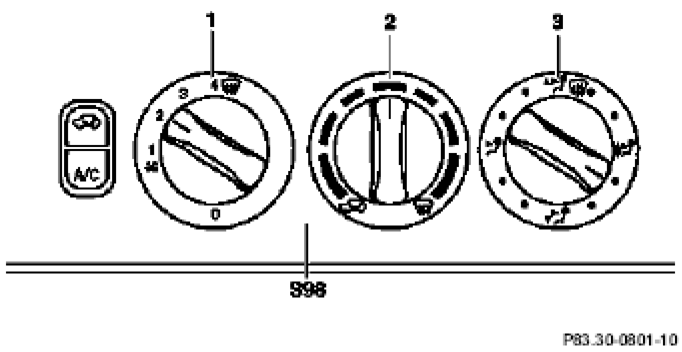


Fig. 56: Identifying Blower Switch, Temperature Selector Wheel And Air Distribution Switch

	Blower switch, location/task/design/function		GF83.25-P-2100GC
	Air distribution switch, location/task/design/ function		GF83.25-P-2101GH
	Temperature selector wheel, location/task/ design/function		GF83.25-P-2102GC
	Air recirculation switch, location/task/design/ function		GF83.10-P-2117GH
	AC button, location/task/function		GF83.30-P-2103GH
	AC control module location/task/function		GF83.30-P-2102GH
	All-activity module, location/task/function		GF54.21-P-4110GH

AIR CONDITIONING CONTROL MODULE, LOCATION - GF83.30-P-2102-02GH

The AC control module (N19) is located behind the center console to the left of the evaporator housing.

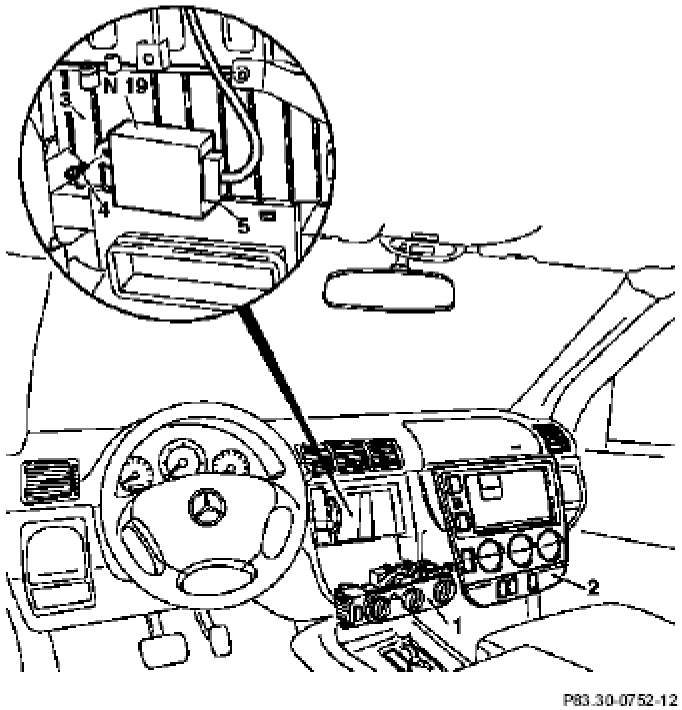


Fig. 57: Identifying AC Control Module

AC CONTROL MODULE LOCATION/TASK/FUNCTION - GF83.30-P-2102GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

	Air conditioning control module, location		**GF83.30-P-2102-02GH**
	Air conditioning control module, task	Control of air conditioning ◦ Recording input signals of various components ◦ Internal processing of input signals ◦ Sending of control signals to various components	
	Air conditioning control module, function	The AC control module records the input signals of various components, in order to check the preconditions for proper and intended operation. It sends control signals to the following components: Blending air flap actuator motor, fresh air/recirculated air flap actuator motor, All-activity module. The air conditioning (tempmatic) control module (TAC) receives input data from the following devices: AC button, in-car temperature sensor, temperature selector wheel, blower switch, icing protection temperature switch, blending air flap position signal.	

AC BUTTON, FUNCTION - GF83.30-P-2103-01GH

Function

Pressing the AC button (⚠ Danger!) switches on the cooling mode.

AC button (⚠ Danger!) pressed

Diode is illuminated, cooling mode/air dehumidification, refrigerant compressor ON

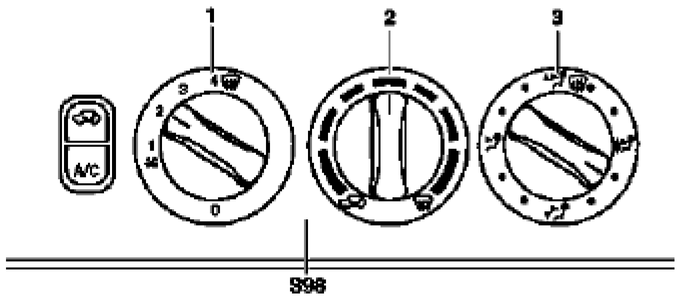
AC button (⚠ Danger!) not depressed

Diode not illuminated, no air dehumidification/no cooling mode, refrigerant compressor **OFF**

The AC button (⚠ Danger!) is connected to the A/C control module, which regulates the refrigerant compressor through the all-activity module. The refrigerant compressor is only active when the engine is running and the blower switched on. To be able to determine the cut-in point for the electromagnetic coupling on the refrigerant compressor, the all-activity module must receive additional data from the CAN bus, such as, e.g. the engine speed.

AC BUTTON, LOCATION - GF83.30-P-2103-02GH

The AC button (⚠ Danger!) is located in the air conditioning control module (S98).



P83.30-0801-10

Fig. 58: Identifying AC Button On Air Conditioning Control Module

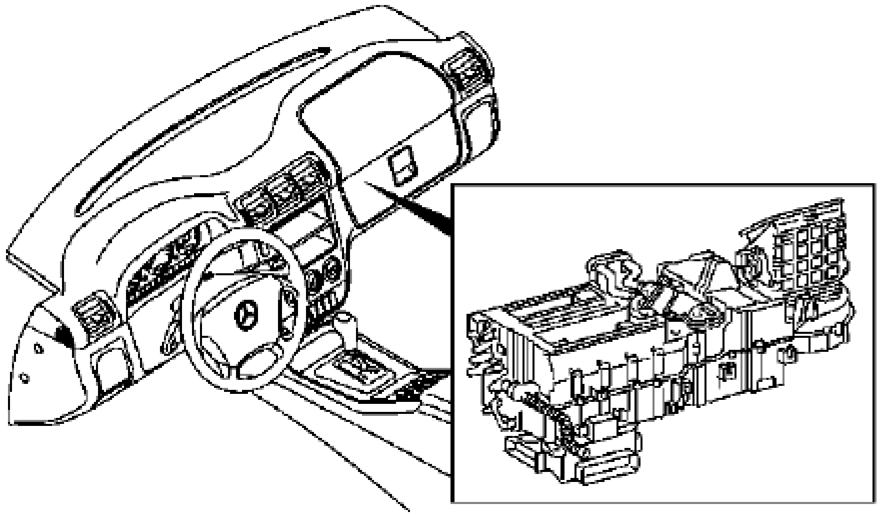
AC BUTTON, LOCATION/TASK/FUNCTION - GF83.30-P-2103GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

	AC button, location		**GF83.30-P-2103-02GH**
	AC button, task	The AC button is used to switch the air conditioning system on and off.	
	AC button, function		**GF83.30-P-2103-01GH**

EVAPORATOR HOUSING, POSITION - GF83.30-P-2104-01GH

The evaporator housing (1) is located below the instrument panel.



P83.20-2012-05

Fig. 59: Identifying Evaporator Housing

EVAPORATOR HOUSING, FUNCTION - GF83.30-P-2104-02GH

Operating condition: Air ducting in heating mode

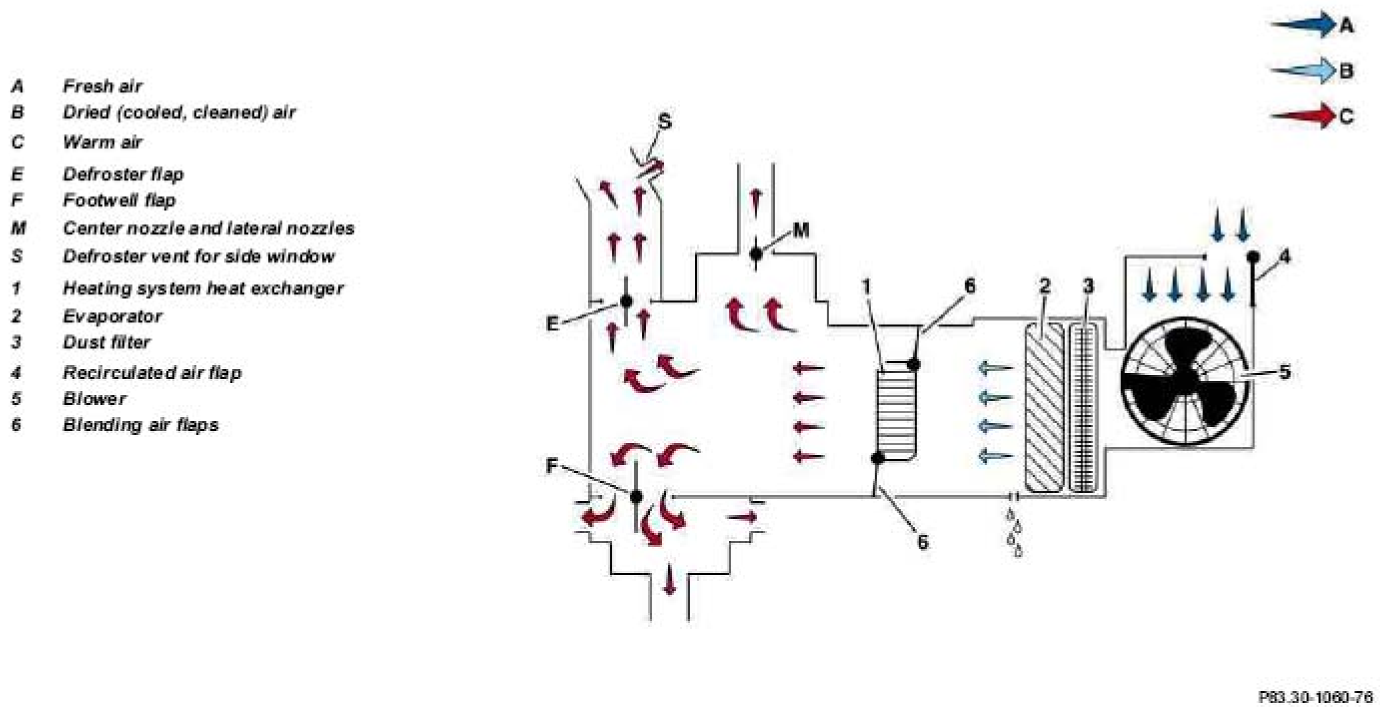


Fig. 60: Identifying Evaporator Housing Function - Operating Condition Air Ducting In Heating Mode

Operating condition: HEATING Function

In the heating operating status, the fresh air (A) is drawn in by the blower (5) into the evaporator housing and routed through the dust filter (3). The air purified by the dust filter (3) is then routed through the evaporator (2) and dried there. The fresh air (B), which has been dried, cooled and cleaned, is subsequently routed through the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The fresh air (B), which has been dried, cooled and cleaned, is heated up again in the heat exchanger (1). The warm air (C) is conducted via the air outlets (E, F, M and S) into the vehicle interior. The recirculated air flap (4) is closed.

Operating condition: Air ducting in cooling mode

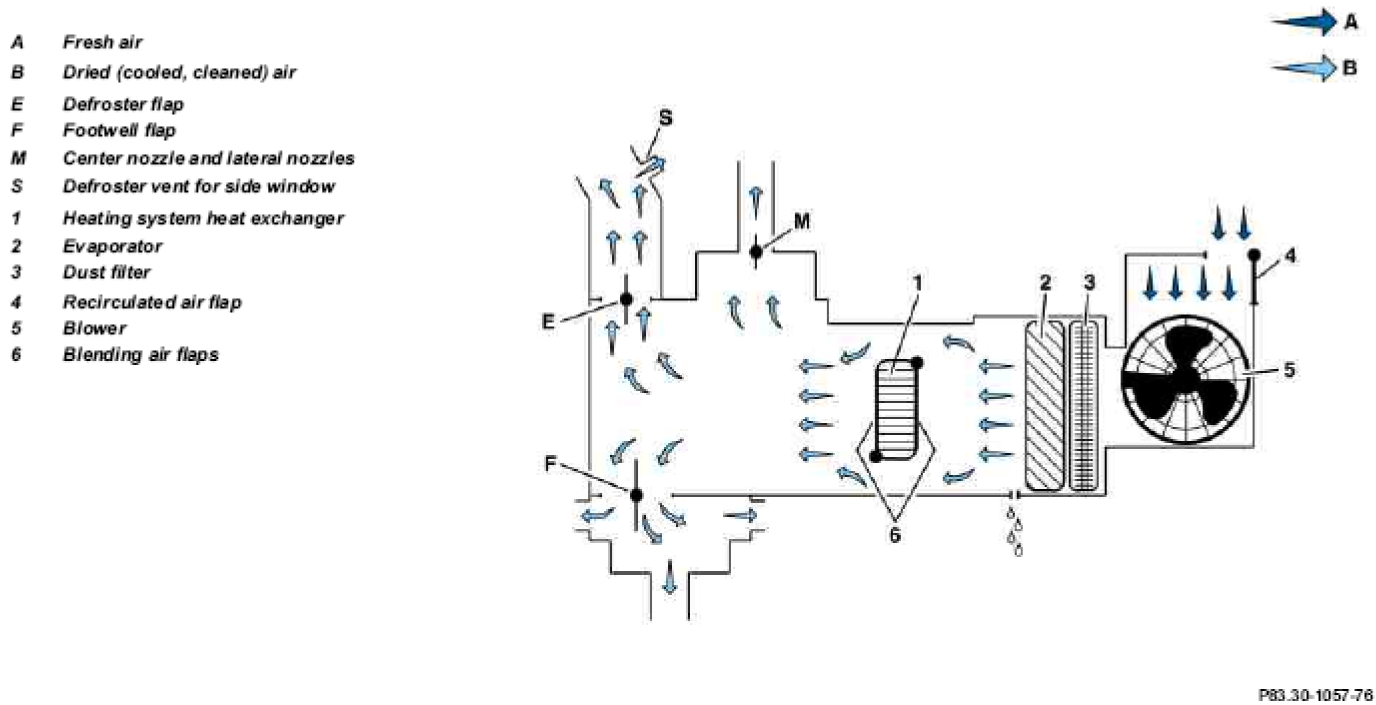


Fig. 61: Identifying Evaporator Housing Function - Operating Condition Air Ducting In Cooling Mode)

Operating condition: cooling Function

In the cooling operating status, the fresh air (A) is drawn in by the blower (5) into the evaporator housing and routed through the dust filter (3). The air purified by the dust filter (3) is then routed through the evaporator (2) and dried there. The fresh air (B), which has been dried, cooled and cleaned, is subsequently routed around the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The dried, cooled and cleaned air (B) is routed directly into the passenger compartment via the air outlets (E, F, M and S). The recirculated air flap (4) is closed.

Operating condition: Blend air ducting (warm/cold) closed-loop operation

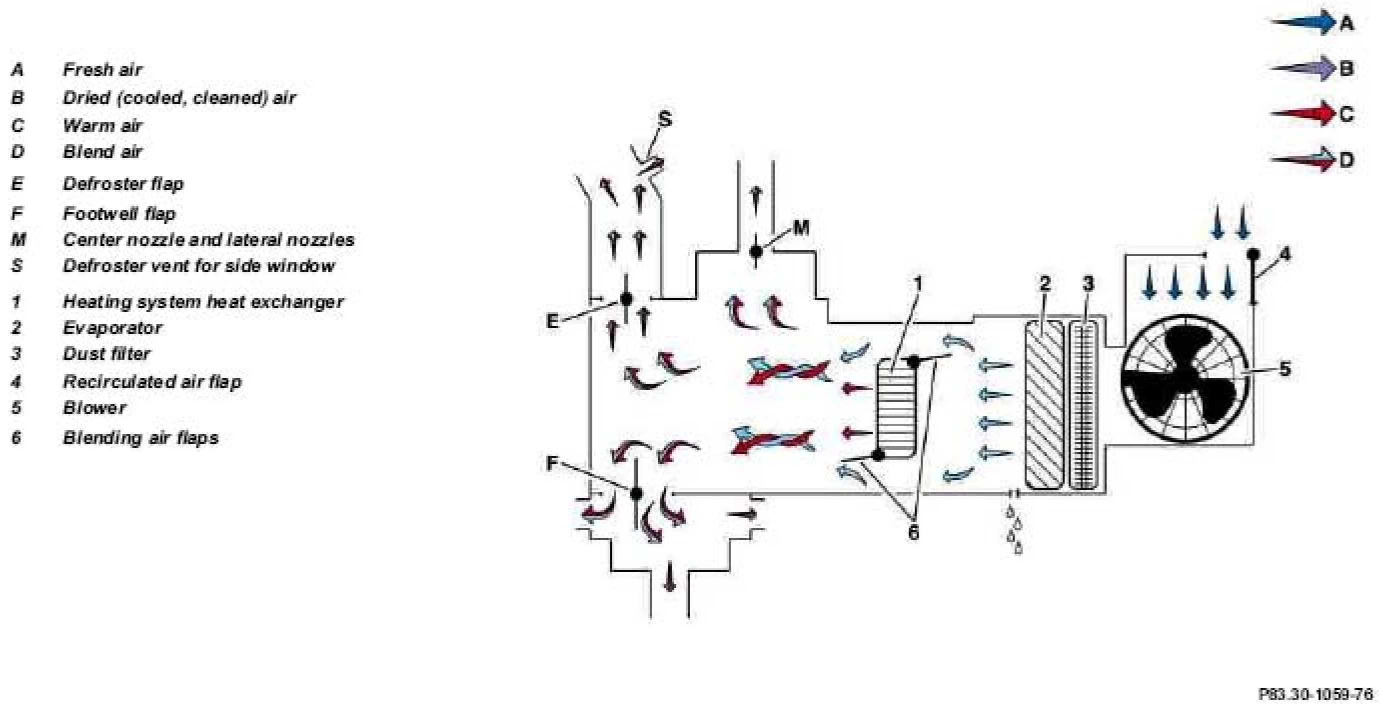


Fig. 62: Identifying Evaporator Housing Function - Operating Condition Blend Air Ducting (Warm/Cold) Closed-Loop Operation

Operating condition: Blend air (warm/cold) Function

In the blend air operating status, the fresh air (A) is drawn in by the blower (5) into the evaporator housing and routed through the dust filter (3). The air purified by the dust filter (3) is then routed through the evaporator (2) and dried there. Some of the dried, cold and cleaned air (B) is routed through the heat exchanger (1) and some is routed around the heat exchanger (1). This air conduction is controlled via the central setting of the blending air flaps (6).

The air (B), which has been dried, cooled and cleaned by the heat exchanger (1) is heated up again. After passing through the blending air flaps (6) this heated air (C) is mixed up to form blend air (D) with the dried, cooled and cleaned air, which was routed around the heat exchanger (1). This blend air (D) is then routed via the air outlets (E, F, M and S) into the passenger compartment. The recirculated air flap (4) is closed.

Operating condition: Air ducting "recirculation air" in cooling mode

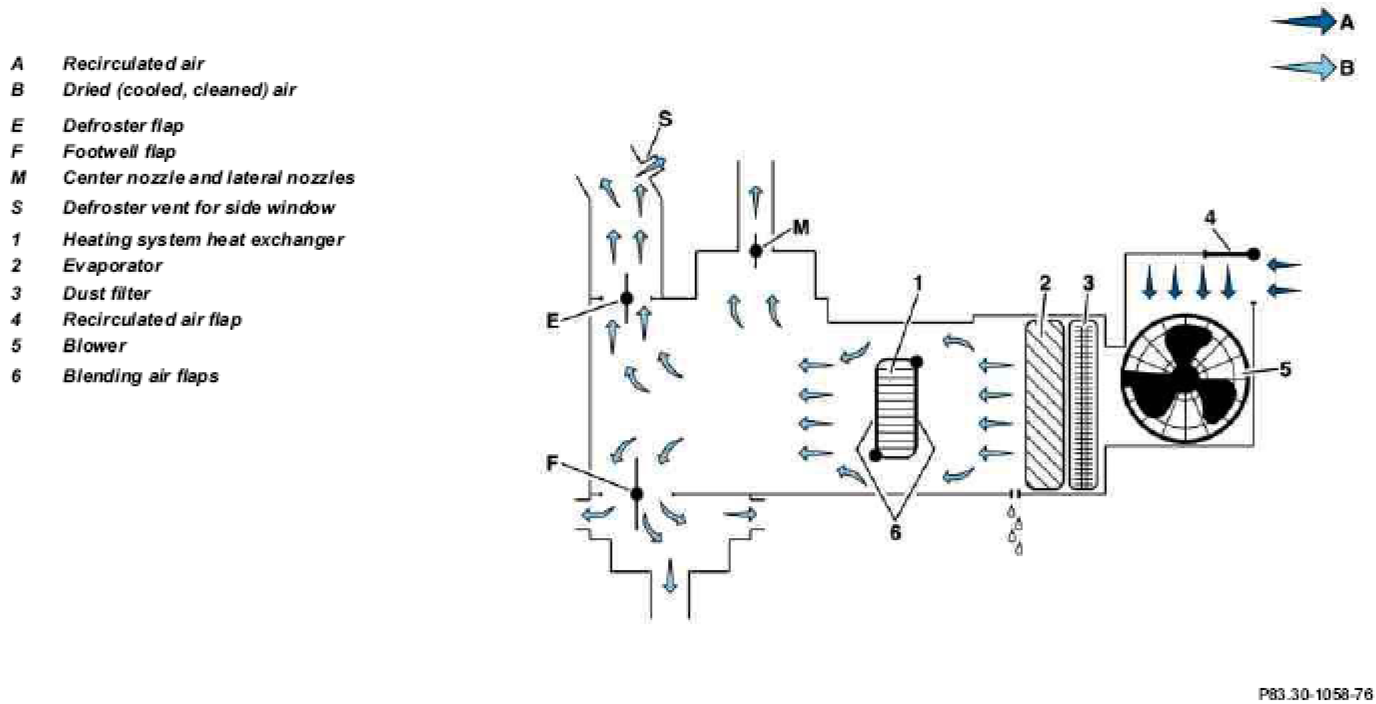


Fig. 63: Identifying Evaporator Housing Function - Operating Condition Air Ducting Recirculation Air In Cooling Mode)

Operating condition: Cooling down "recirculation air" Function

In the cooling mode with recirculating air the blower (5) draws the recirculated air (A) from the passenger compartment over the opened recirculated air flaps (4) into the evaporator housing and routes it through the dust cleaner (3). The air purified by the dust filter (3) is then routed through the evaporator (2) and dried there. The fresh air (B), which has been dried, cooled and cleaned, is subsequently routed around the heat exchanger (1). This air conduction is controlled via the setting of the blending air flap (6).

The dried, cooled and cleaned air (B) is routed directly into the passenger compartment via the air outlets (E, F, M and S). The supply of fresh air is cut off by the recirculated air flap (4).

EVAPORATOR HOUSING, TASK - GF83.30-P-2104-04GH

The evaporator housing houses the following components:

- Air ducting flaps
- Dust filter
- Blower
- Series resistor group
- Evaporator
- Heating system heat exchanger
- Expansion valve

- Blending air flap actuator
- Recirculated air flap actuator motor
- Electric heater booster (for engine 612.963 only) and therefore forms a complete unit.

The evaporator housing distributes the air that is required to ventilate the vehicle to the relevant air ducts and vents depending on the required interior temperature.

The air ducting depends on various operating conditions such as:

- Heating mode
- Cooling mode
- Blend air mode (cold/warm)
- Cooling air mode with recirculated air

FRESH AIR/RECIRCULATED AIR FLAP ACTUATOR MOTOR, POSITION - GF83.30-P-2105-01GC

The fresh air/recirculated air flap actuator motor (M16/7) is located on the A/C housing between the two fresh air/recirculated air flaps.

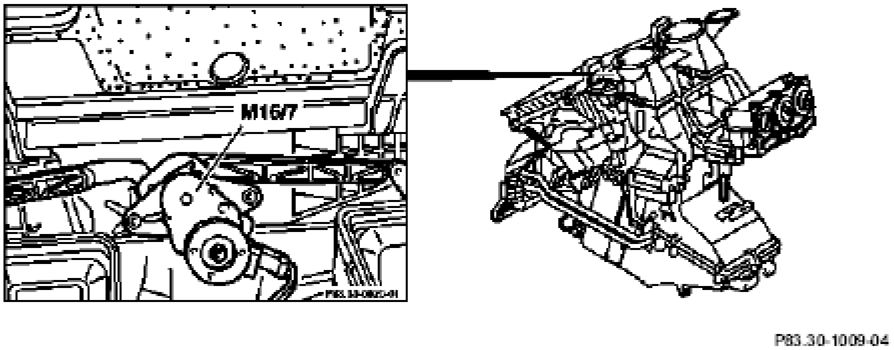


Fig. 64: Identifying Fresh Air/Recirculated Air Flap Actuator Motor

FRESH AIR/RECIRCULATED AIR FLAP ACTUATOR MOTOR, POSITION - GF83.30-P-2105-01GH

The fresh air/recirculated air flap actuator motor (M39) is located at the side of the air intake housing on the evaporator housing.

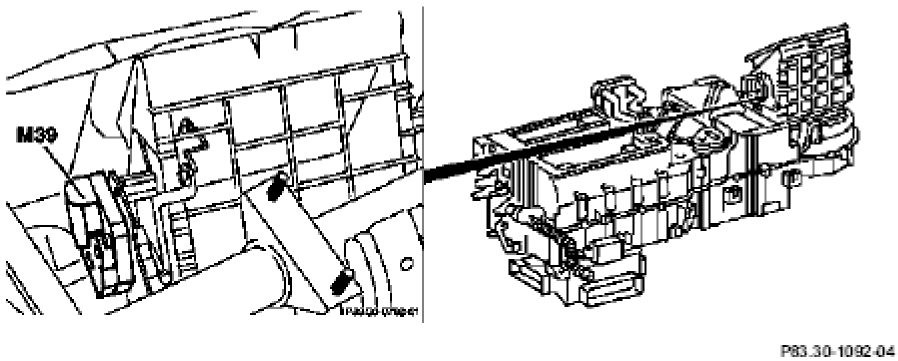


Fig. 65: Identifying Fresh Air/Recirculated Air Flap Actuator Motor

FRESH AIR/RECIRCULATED AIR FLAP ACTUATOR MOTOR, FUNCTION - GF83.30-P-2105-02GH

Function

The fresh air/recirculated air flap actuator motor (M39) is controlled via the recirculation air switch ( ) and when the temperature selector switch is set to max. cooling output in the control module (S98).

Recirculated air mode (100 % recirculated air)

In the recirculated air mode the supply of fresh air is closed by the fresh air/recirculated air flap actuator motor (M39) and simultaneously the recirculated air supply opened without any time limit.

Fresh air mode (100 % fresh air)

In the fresh air mode the supply of fresh air is opened by the fresh air/ recirculated air flap actuator motor (M39) and simultaneously the recirculated air supply closed without any time limit.

Auxiliary function at air conditioning (TAC)

When, in the cooling mode, the temperature selector wheel is set to max. cooling (position indented blue) then at the same time the fresh air/recirculated air flap actuator motor (M39) is controlled and switched to recirculation air without time limit.

FRESH AIR/RECIRCULATED AIR FLAP ACTUATOR, FUNCTION - GF83.30-P-2105-02GI

Function

Pressing the recirculating air push-button ( ) on the AAC push-button control module (N22) actuates the fresh air/recirculated air flap actuator motor (M2/5) via the air conditioner bus.

In recirculation mode, the recirculation air supply is closed off by the fresh air/recirculated air flap.

In fresh air mode, the fresh air supply is opened by the fresh air/ recirculated air flap.

Control of fresh air/recirculated air flap via the AAC push-button control module (N22)

When the recirculating air push-button is pressed () on the AAC push-button control module the system is switched by means of the fresh air/recirculated air flap actuator motor straight to 100 % recirculation air. This is displayed by the function LED.

NOTE: The recirculated air function can be terminated after a set time-out in accordance with country specifications.

NOTE: All actuators are identical.

If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After replacement of an actuator motor it is necessary for an adjustment run to be performed using the diagnosis assistant system (DAS), i.e. the end positions flap OPEN and SHUT are defined and retained.

AIR CONDITIONING FLUID RESERVOIR, LOCATION - GF83.30-P-2106-01GH

The fluid reservoir (6) is located in the left front of the engine compartment, next to the condenser.

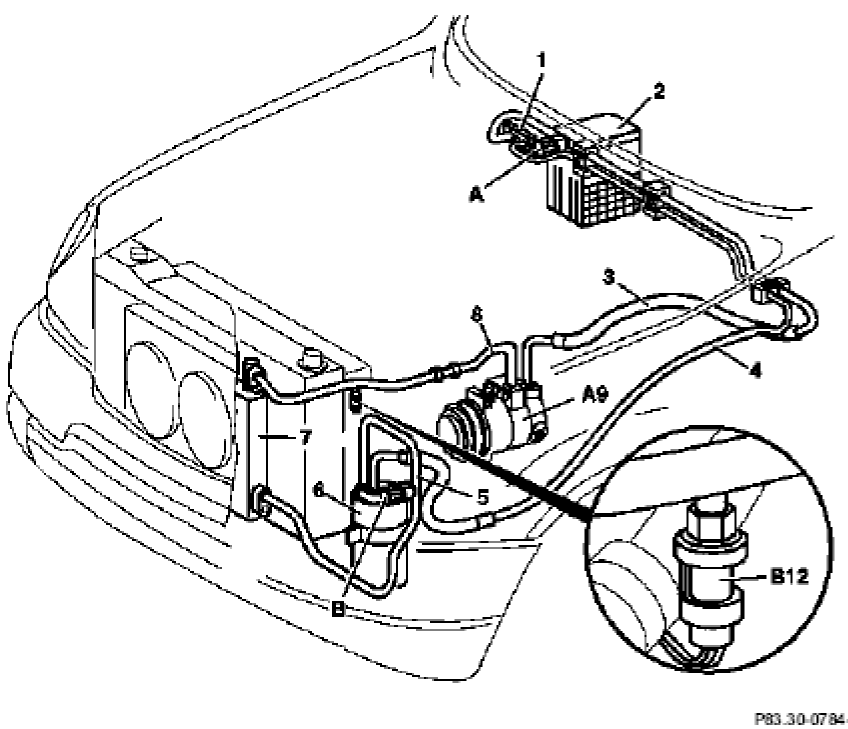


Fig. 66: Identifying Air Conditioning Fluid Reservoir And Associated Components

AIR CONDITIONING FLUID RESERVOIR, FUNCTION - GF83.30-P-2106-02GC

Function

The liquefied refrigerant is routed under pressure into the fluid reservoir and flows through a stainless steel meshing to the filter block. The pores in the filter block are matched precisely to the refrigerant's molecular size. Thus the refrigerant can flow through the filter block.

All other matter, primarily water, is held back by this molecular filter and deposited. The cleaned refrigerant flows over a rising pipe to the expansion valve.

Whenever the system is opened, the fluid reservoir should be replaced because of the water which has collected there in the meantime.

ALL-ACTIVITY MODULE, LOCATION - GF83.30-P-2108-02GH

The all-activity module (AAM) (N10) is located in the left-hand side of the engine compartment. It is plugged on from below to the fuse and relay module (F1).

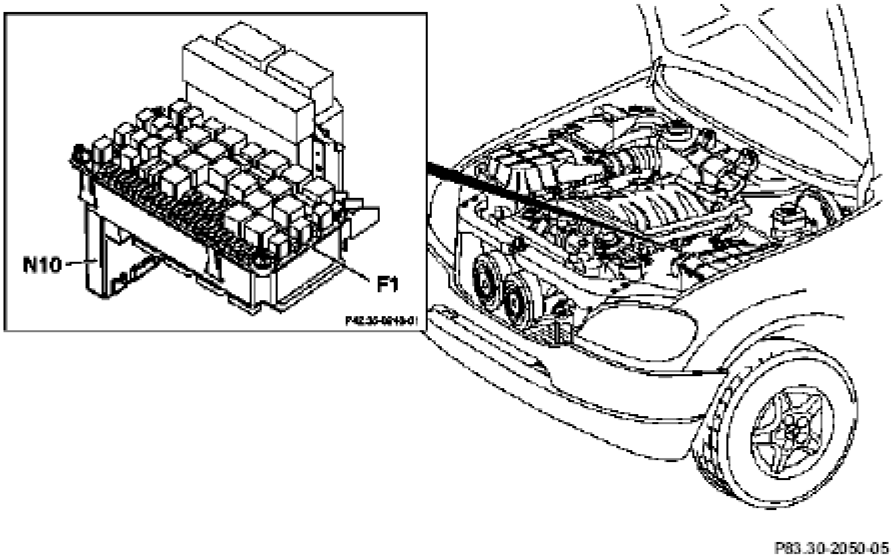


Fig. 67: Identifying All-Activity Module And Relay Module

FRESH AIR/RECIRCULATED AIR FLAP ACTUATOR, LOCATION/TASK/FUNCTION - GF83.30-P-2116GC

MODELS 163 up to 31.8.01, 168 up to 28.2.01 with CODE (580) Air conditioning or Tempmatic for USA

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

Shown on model 163 as of 1.09.01

M2/5 Fresh air/recirculated air flap actuator

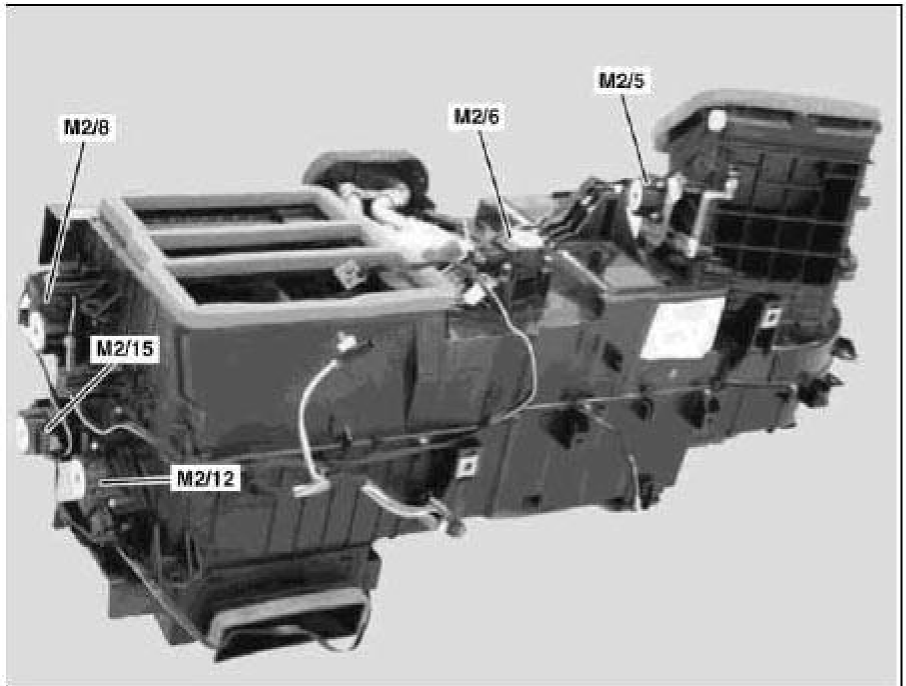


Fig. 68: Identifying Fresh Air/Recirculated Air Flap Actuator - Shown On Model 163 As Of 1.09.01

	Fresh air/recirculated air flap actuator, position	The fresh air/recirculated air flap actuator (M2/5) is located on the side of the air inlet duct of the air conditioner housing. Model 168 Model 163, up to 31.08.01	**GF83.30-P-2105-01GC** **GF83.30-P-2105-01GH**
	Fresh air/recirculated air flap actuator, task	The fresh air/recirculated air flap actuator serves to cut off the supply of fresh air when required.	
	Fresh air/recirculated air flap actuator, function	Model 168 Model 163, up to 31.08.01 Model 163 as of 1.09.01	GF83.30-P-2105-02GC **GF83.30-P-2105-02GH** **GF83.30-P-2105-02GI**

EVAPORATOR HOUSING, LOCATION/TASK/FUNCTION - GF83.30-P-2119GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

	Evaporator housing, location		**GF83.30-P-2104-01GH**
			GF83.30-P-2104-

Evaporator housing, task		**04GH**
Evaporator housing, function		**GF83.30-P-2104-02GH**
	At maximum heating mode in vehicles with engine 612.963 only	GF83.30-P-2104-02GK

AIR CONDITIONING FLUID RESERVOIR, LOCATION/TASK/FUNCTION - GF83.30-P-2120GC

MODELS 163 up to 31.8.01

168 up to with code (580) Air conditioning or Tempmatic for USA

Fluid reservoir (TAC), location	Model 168	GF83.30-P-2106-01GC
	Model 163	**GF83.30-P-2106-01GH**
Fluid reservoir (TAC), task	• Filtering chemical and mechanical impurities out of the refrigerant • Volume accumulator for refrigerant • Draining of refrigerant	
Fluid reservoir (TAC), function		**GF83.30-P-2106-02GC**

OVERVIEW OF AIR CONDITIONING (TAC) SYSTEM COMPONENTS, LOCATION/PURPOSE/DESIGN/FUNCTION - GF83.30-P-9999GI

MODEL 163 up to 31.8.01 with CODE (580a) Automatic air conditioning

Air inlet, location/function		**GF83.10-P-2138GC**
Air ducts, location/purpose/design		**GF83.10-P-2139GH**
Blower, location/purpose/design/function		**GF83.10-P-2102GC**
Series resistor group, location/purpose/function		**GF83.10-P-2161GC**
Dust filter, location/purpose/function		**GF83.10-P-2142GH**
Rear vent, location/purpose/function		**GF83.10-P-2143GC**
Defroster vent, location/purpose/function		**GF83.10-P-2144GC**
Center nozzle, location/purpose/function		**GF83.10-P-2149GC**

Lateral nozzle, location/purpose/function		**GF83.10-P-2150GC**
Front footwell air outlet, location/purpose/ function		**GF83.10-P-2145GC**
Rear footwell air outlet, location/purpose/ function		**GF83.10-P-2146GC**
Heating system heat exchanger, location/ purpose/function		**GF83.20-P-2108GC**
Fresh air/recirculation flap, location/purpose/ function		**GF83.20-P-2111GC**
Fresh air/recirculation flap actuator, location/ purpose/function		**GF83.30-P-2116GC**
Blower switch, location/purpose/design/function		**GF83.25-P-2100GC**
Air distribution switch, location/purpose/design/ function		**GF83.25-P-2101GH**
Temperature selector wheel, location/purpose/ design/function		**GF83.25-P-2102GC**
Air recirculation switch, location/purpose/ design/function		**GF83.10-P-2117GH**
AC button, location/purpose/function		**GF83.30-P-2103GH**
AC control module, location/purpose/function		**GF83.30-P-2102GH**
All-activity module, location/purpose/function		**GF54.21-P-4110GH**
A/C housing, location/purpose/function		**GF83.30-P-2119GH**
Auxiliary fan, location/purpose/function	ENGINE 111.977, 112.942	**GF83.40-P-2162GH**
Electric fan motor/air conditioning system, location/purpose/function	Engine 113.942, 113.981 and 612.963, 628.963	**GF83.40-P-2151GH**
Condenser, location/purpose/function		**GF83.40-P-2152GC**
Evaporator location/purpose/design/function		**GF83.40-P-2121GC**
Fluid reservoir (TAC), location/purpose/function		**GF83.30-P-2120GC**
Expansion valve, location/purpose/design/ function		**GF83.40-P-2123GC**
Refrigerant pressure sensor, location/purpose/ function		**GF83.40-P-2156GH**
Refrigerant compressor, location/purpose/ design/function		**GF83.55-P-2100GH**

Electromagnetic clutch, location/purpose/ design/function		**GF83.55-P-2101GH**
In-car temperature sensor, location/purpose/ function	with intake jet nozzle up to 30.11.99	**GF83.57-P-2115GH**
In-car temperature sensor with ventilation blower, location/purpose/function	as of 1.12.99	**GF83.57-P-2107GH**
Ice-up protection temperature sensor, location/ purpose/function		**GF83.57-P-2113GH**
Blending air flap actuator, location/purpose/ function		**GF83.57-P-2112GC**
Outside temperature sensor, location/purpose/ function	as of 1.12.99	**GF83.57-P-2110GH**
Electric heater booster, location/purpose/ design/function	Engines 612.963 and 628.963	GF83.70-P-4054GH
Temperature regulator microswitch, location/ purpose/function	Engine 612.963	GF83.70-P-4055GH
Extended activity module, location/purpose		**GF54.21-P-4106GH**
Extended activity module, location/purpose/ design	as of 1.12.99	**GF54.21-P-4107GK**
CDI control module, location/purpose/function	Engine 612.963	GF07.16-P-3102IA

AUTOMATIC AIR CONDITIONING (AAC), FUNCTION - GF83.40-P-0001GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

Function

The automatic air conditioning (AAC) is equipped with an electronically regulated cooling, heating and ventilating system and can be summed up by the following list of subfunctions.

- **Ventilation**

  The ventilation ensures that there is a sufficient supply of air within the passenger compartment. Ventilation is achieved with the support of the blower during normal operation, when vehicle is standing or to increase the air flow. The air is distributed in the passenger compartment using air distribution flaps.

- **Automatic air conditioning temperature control**

  The desired temperature is reached or held constant by cooling or heating the air. Precise temperature control can be achieved by reading in the various temperature sensors.

- **Residual engine heat utilization**

The residual engine heat utilization system allows the vehicle to be heated even when the ignition **is switched** OFF. **To do so the system utilizes the residual heat from the engine and guides it via the blower into the passenger compartment. The heating water circulation pump ensures that the coolant is properly circulated.**

- **Automatic air conditioning push-button control module**

  The automatic air conditioning can be operated by the driver using various tip switches. Apart from this the push-button control module reads in different sensor signals, processes them and controls components in the automatic air conditioning.

- **Rear ventilation control panel**

  The operator can intervene in the automatic regulation of the rear ventilation through the automatic air conditioning by using the rear ventilation control panel and adjust it accordingly to suit needs at any given time. With the aid of the air distribution switch and blower switch the operator can accommodate his/her own wishes. The correspondingly altered function is then no longer regulated by the automatic air conditioning.

  By pressing the automatic control button the manually initiated settings can be reset and thus regulated again by the automatic air conditioning.

  Regulation of the air quantity and air distribution ensues thus solely by way of the automatic air conditioning push-button control module.

- **Heater circuit**

Coolant is heated by the engine. Subsequently, the heated coolant is then routed through the heat exchanger, where the heat is dissipated to the air in the passenger compartment. The heater return line, in which the heating water circulation pump is located, takes the coolant back to the coolant pump.

The heating water circulation pump ensures that the coolant is properly circulated.

The coolant flows through the heat exchanger permanently.

Depending upon the desired in-car temperature, regulation is conducted over the blending air flaps, which are operated by the blending air flap actuator motor.

Heater operation with heater booster in vehicles with OM 612.963

In vehicles equipped with direct-injection diesel engines, an electrical heater booster is additionally installed in the evaporator housing downstream of the heat exchanger, in order to compensate the heater output deficit which occurs in the case of certain operating conditions.

The 3 heating elements in the heater booster are supplied with current, as a result of which they are heated and start to glow. As a result of the structural conditions, it is ensured that the drawn in fresh air flows directly past the electric heater booster, and is therefore heated.

- **Refrigerant circuit**

The refrigerant compressor serves to compresses the gaseous refrigerant which heats up during the process, is then routed into the condenser and thus cooled down. After purification in the fluid reservoir the liquid refrigerant is injected into the evaporator. The refrigerant is vaporized and cools down. The refrigerant compressor intakes the refrigerant again which has turned gaseous through the heat absorption process.

	Ventilation, function		**GF83.10-P-2000GI**
	Heater circuit function		**GF83.20-P-2003GH**
	Automatic air conditioning push-button control module, function		**GF83.40-P-2000GI**
	Rear ventilation control panel, function		**GF83.40-P-2007GI**
	Refrigerant circuit function		**GF83.40-P-2001GI**
	Temperature control, function		**GF83.57-P-2000GI**
	Heater booster (ZUH), function		GF83.70-P-0005GH
	Residual engine heat utilization system, function		**GF83.75-P-2000GI**

TABLE OF CONTENTS, AUTOMATIC AIR CONDITIONING (AAC) FUNCTION DESCRIPTION - GF83.40-P-0999GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

	Automatic air conditioning (AAC), function		**GF83.40-P-0001GI**
	Ventilation system function		**GF83.10-P-2000GI**
	Heater circuit function		**GF83.20-P-2003GH**
	Automatic air conditioning push-button control module, function		**GF83.40-P-2000GI**
	Rear ventilation control panel, function		**GF83.40-P-2007GI**
	Refrigerant circuit function		**GF83.40-P-2001GI**
	Temperature control, function		**GF83.57-P-2000GI**
	Heater booster (ZUH), function	Engine 612.963	GF83.70-P-0005GH
	Start heater operation, function	Engine 612.963	GF83.70-P-2000GH
	End heater operation, function	Engine 612.963	GF83.70-P-2002GH
	Regulate heater operation, function	Engine 612.963	GF83.70-P-2004GH
	Cancel heater operation, function	Engine	GF83.70-P-

		612.963	2005GH
	Residual engine heat utilization system, function		**GF83.75-P-2000GI**
	Automatic air conditioning system component summary, location/purpose/design/function		**GF83.40-P-9990GI**

AUTOMATIC AIR CONDITIONING PUSH-BUTTON CONTROL MODULE, FUNCTION - GF83.40-P-2000GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

1	Blower switch
2	Temperature selector wheel
3	Air distribution switch
	Defroster button
	Recirculated air pushbutton
AUTO	Auto button
AC OFF	AC OFF button
REST	REST button (residual engine heat utilization), is combined with the AC button
	Rear compartment air distribution button
	Rear window heater button
N22	Automatic air conditioning (AAC) pushbutton control module
N22b1	Interior air temperature sensor

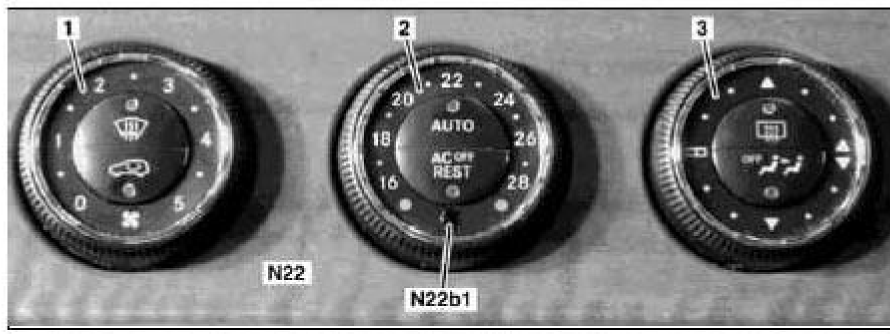


Fig. 69: Identifying Blower Switch, Temperature Selector Wheel, Air Distribution Switch And Interior Air Temperature Sensor

Function

The AAC push-button control module (N22) makes it possible to make adjustments coming from the driver such as:

- air quantity, by adjusting the blower switch setting (1)
- temperature by setting the temperature selector wheel (2)
- air distribution, by setting the air distribution switch (3)
- defrost function by pressing the defroster button ( )
- recirculated air mode by pressing the recirculated air push-button ( )
- automatic air distribution/blower speed by pressing the Auto
- switching off the cooling by pressing the AC button (AUTO)
- activating the residual engine heat utilization system with the ignition switched off by pressing the REST button (AC OFF)
- heating the rear window by pressing the rear window heating button ( )
- switching off the air distribution to the rear compartment by pressing the rear compartment air distribution button ( )

The control module integrated in the AAC push-button control module (N22) looks after all system regulation and control functions such as:

- comparing preselected and actual temperatures and controlling the air temperature at the air outlets
- automatic switchover from fresh air to recirculated air mode
- electrical control of refrigerant compressor
- controlling the auxiliary fan or the electric suction-type fan motor/ air conditioning with integrated control

The AAC push-button control module (N22) has a diagnostic capability. Consequently, any faults which occur are stored in the fault memory which can be read with the help of the diagnosis assistant system (DAS).

When the AAC push-button control module is replaced (N22), variant coding must be carried out using the Diagnosis Assistant System (DAS).

The AAC push-button control module (N22) also performs the following actuations:

- **direct:** refrigerant compressor; heating water circulation pump; PTC heater booster (OM 612 only), rear window heater
- **via the CAN BUS:** auxiliary fan, electric suction-type fan motor/air conditioning with integrated control, blower control and air distribution in the rear compartment (automatic mode)
- **via the AC bus:** blower motor; 8 stepping motors for air distribution

The following sensor signals are read in by the AAC push-button control module (N22):

- **direct:** temperature sensor evaporator, pressure and temperature sensor refrigerant, in-car temperature sensor, center nozzle vent air temperature sensor, footwell and rear passenger compartment, sun sensor
- **via the CAN BUS:** Ambient temperature display temperature sensor, sensor for specified values in rear control panel

	Description		Reference
	Blower switch, location/task/design/function		**GF83.25-P-2100GI**
	Temperature selector wheel, location/task/ design/function		**GF83.25-P-2102GI**
	Air distribution switch, location/task/design/ function		**GF83.25-P-2101GI**
	Defroster button, location/task/function		**GF83.40-P-2139GI**
	Recirculating air push-button, location/task/ function		**GF83.40-P-2145GI**
	Auto button, location/task/function		**GF83.40-P-2147GI**
	AC OFF button, location/task/function		**GF83.40-P-2107GI**
	Rest push-button, location/task/function		**GF83.40-P-2148GI**
	Rear passenger compartment air distribution button, location/task/function		**GF83.40-P-2173GI**

REFRIGERANT CIRCUIT FUNCTION - GF83.40-P-2001GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

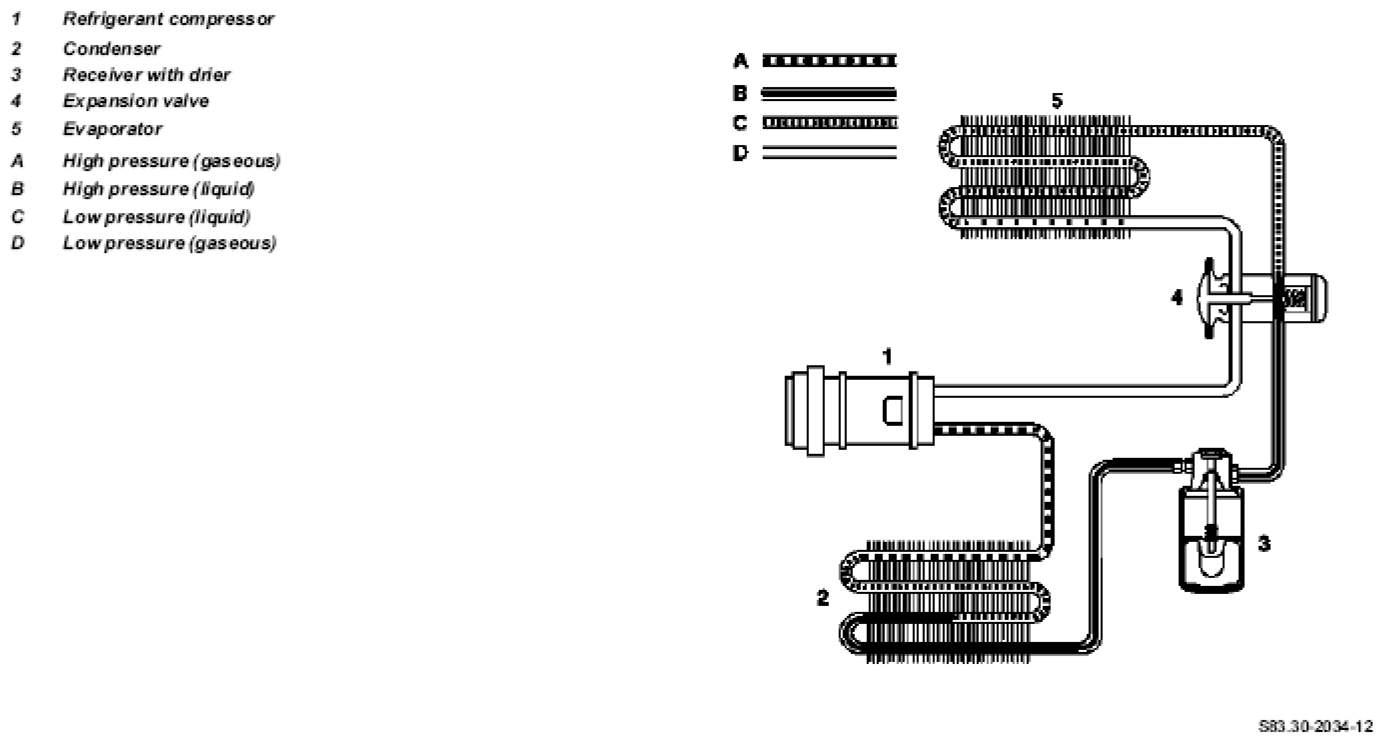


Fig. 70: Identifying Refrigerant Circuit Function (Model 163 Up To 31.8.01 With Code (580) Air Conditioning Or Tempmatic For USA)

The refrigerant compressor (1) driven by motor compresses the gaseous refrigerant, which is thereby heated up and routed to the condenser (2).

The condenser's (2) surface withdraws the refrigerant's compression heat. When cooling down the refrigerant liquefies.

When flowing through the fluid reservoir (3) the refrigerant is purified of any chemicals and mechanical impurities and the water in the refrigerant is separated and collected.

The expansion valve (4) injects the cooled down and liquefied refrigerant in the evaporator (5), which is located in the fresh air flow. Here the refrigerant is vaporized. This vaporization process then withdraws heat from the blow-by fresh air which comes in from outside over the pipe and monolith systems with the result that it cools down.

The humidity carried along with it is converted to condensed water which is routed to the outside. The air is dried.

The refrigerant compressor (1) draws in the refrigerant which has turned gaseous on account of the heat absorption and compresses it again.

When the engine is running and the blower switched on, the passenger compartment can have cool air supplied to it by various outlet nozzles. The intensity of the cooling process depends on the previously set in-car temperature and the blower output.

	Auxiliary fan, location/task/function	Engines 111.977, 112.942	**GF83.40-P-2162GH**
	Electric fan motor/air conditioning, location/task/function	Engines 113.942/981 and 612.963	**GF83.40-P-2151GH**
	Condenser position/task/function		**GF83.40-P-2152GC**
	Evaporator, location/purpose/design/function		**GF83.40-P-2121GC**
	Fluid reservoir (TAC), location/task/function		**GF83.30-P-2120GC**
	Expansion valve, location/task/design/function		**GF83.40-P-2123GC**
	Refrigerant pressure sensor, location/task/ function		**GF83.40-P-2156GH**
	Refrigerant compressor, location/task/design/ function		**GF83.55-P-2100GH**
	Air conditioning control module, location/task/ function		**GF83.30-P-2102GH**
	All-activity module, location/task/design/ function		**GF54.21-P-4110GH**
	Extended-activity module, position/task		**GF54.21-P-4106GH**
	Extended-activity module, location/task/design	as of 1.12.99	**GF54.21-P-4107GK**
	CDI control module, location/task/function	Engine 612.963	GF07.16-P-3102IA

REFRIGERANT CIRCUIT, FUNCTION - GF83.40-P-2001GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

1 AC compressor
2 Capacitor
3 Receiver with drier
4 Expansion valve
5 Evaporator
A High pressure (gaseous)
B High pressure (liquid)
C Low pressure (liquid)
D Low pressure (gaseous)

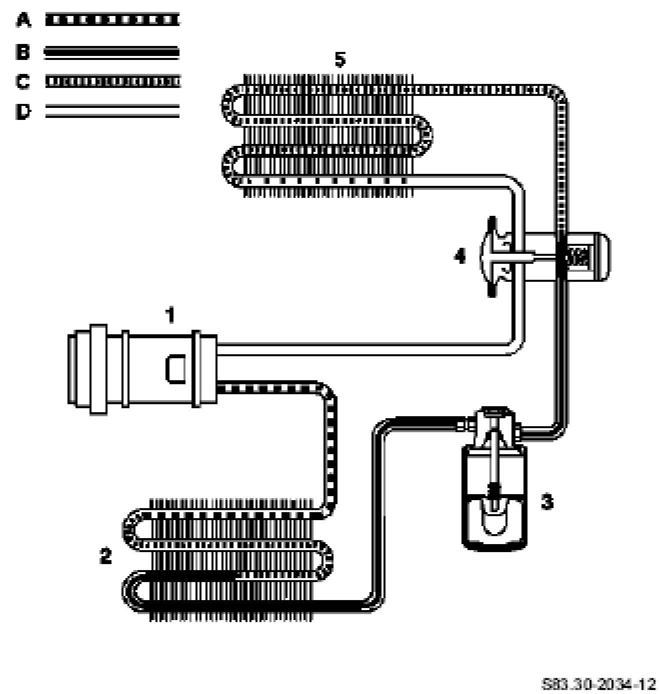


Fig. 71: Identifying Refrigerant Circuit, Function (Model 163 As Of 1.9.01 With Code (580A) Automatic Air Conditioning)

The refrigerant compressor driven by the motor compresses the gaseous refrigerant, which is thereby heated up and routed to the condenser.

The refrigerant's compression heat is then withdrawn on the surface of the condenser. While cooling down, the refrigerant liquefies.

When the refrigerant flows through the fluid reservoir it is cleansed of any chemical and mechanical impurities. The water contained in the refrigerant is separated and collected.

The expansion valve sprays the cooled and liquefied refrigerant into the evaporator, which is located in the fresh-air flow. Here the refrigerant is vaporized. Through this evaporation process heat is extracted from the fresh air flowing past from outside over the tube and fin system so that air cools down.

The air humidity carried along is converted to condensed water, which escapes into the open. The air dries out.

The refrigerant compressor aspirates the refrigerant which has turned gaseous on account of the heat absorption and then compresses it yet again.

When the engine is running and the blower switched on, the interior can be supplied with cooled air through the various air outlets. Cooling intensity is dependent upon the preset in-car temperature and blower setting.

	Engine 111.977, 112.942, 112.970	

	Auxiliary fan, location/purpose/function	with code 580 up to 31.08.01 Engine 112.942, 112.970 with code 580a as of 01.09.01	**GF83.40-P-2162GH**
	Engine and AC electric suction fan with integrated control, location/purpose/function	Engine 113.942 with code 580a up to 31.08.01 Engine 113.981, 113.965, 612.963, 628.963 with code 580a as of 01.09.01	**GF83.40-P-2172GI**
	Condenser, location/purpose/function		**GF83.40-P-2152GC**
	Evaporator location/purpose/design/function		**GF83.40-P-2121GC**
	Fluid reservoir, location/purpose/function		**GF83.40-P-2153GI**
	Expansion valve, location/purpose/design/ function		**GF83.40-P-2123GC**
	Refrigerant pressure and temperature sensor, location/purpose/function		**GF83.40-P-2171GI**
	Refrigerant compressor, location/purpose/ design/function		**GF83.55-P-2100P**
	Control valve, location/purpose/function		**GF83.55-P-2102P**
	Belt pulley, location/purpose/design/function		**GF83.55-P-2103P**
	Pressure relief valve, location/purpose/function		**GF83.55-P-2104P**

REAR VENTILATION CONTROL PANEL, FUNCTION - GF83.40-P-2007GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

N72/2s3 Rear ventilation control panel

Auto button

Air distribution button

Blower button



Fig. 72: Identifying Rear Ventilation Control Panel

The rear ventilation control panel (N72/2s3) enables specific settings to be made for the rear compartment ventilation system.

The following possibilities are available:

- Setting air quantity by pressing the blower button ( )
- Air distribution by pressing the air distribution button ( )
- Automatic air distribution/blower speed by pressing the Auto button (AUTO) (Control through AAC push-button control module (N22))

	Blower button position/task/function	GF83.40-P-2144GI
	Air distribution button, location/task/function	GF83.40-P-2159GI
	Auto button, location/task/function	GF83.40-P-2147GJ

BLOWER BUTTON, FUNCTION - GF83.40-P-2100-01GI

The blower button ( ) switches a control voltage of 0 - 6 V through to the rear compartment blower control via the rear ventilation control panel (N72/2s3).

By using several blower steps it is possible to regulate the blower speed between 0-100 %.

The automatic blower function can be set by pressing the Auto button, whereby control is assumed by the AAC push-button control module (N22).

AIR DISTRIBUTION BUTTON FUNCTION - GF83.40-P-2101-01GI

Function

By pressing the air distribution button ( ) the rear passenger compartment air distributor flap actuator motor is regulated by the rear ventilation control panel. The rear passenger compartment air distributor flap actuator motor drives the rear passenger compartment air distributor flap, which can route the air into two directions.

Air distribution button ( ) = air ducting to rear compartment nozzle

Air distribution button ( ) = air ducting to the air outlets in the rear footwell

The automatic air distribution function can be set by pressing the Auto button, whereby control is assumed by the AAC push-button control module (N22).

RECIRCULATING AIR PUSH-BUTTON, FUNCTION - GF83.40-P-2102-01GI

Function

A brief actuation (< 1.5 s) of the recirculating air push-button ( ) energizes the actuator motor for the fresh air/recirculated air flap, which activates the fresh air/recirculated air flap and thus closes the fresh air duct and opens the recirculation duct, in order to enable the air supply from the passenger compartment. The function LED illuminates during recirculation mode.

Recirculated air convenience closing function

If the recirculating air push-button ( ) is pressed for longer than > 2 s, then alongside the recirculation function, all open windows and the sliding and tilting roof are automatically closed (**window and sliding/ tilting roof must have been normalized**). The function LED illuminates during recirculation mode. In order to prevent any current peaks the sliding/tilting sunroof and power windows are actuated successively.

If the push-button is pressed again for > 2 s, the windows and the sliding/tilting sunroof return to the previously stored position and the fresh air/recirculated air flap moves to the fresh air position (LED off).

The convenience closing function can only be started if the recirculating LED is not illuminated.

Each window, which has been manually opened during the recirculation phase, remains in this position if the recirculating function is cleared: all other windows move to the stored positions. The position of the sliding/tilting sunroof prior to the start of the closing operation and that of the side windows is stored in the memory. The windows and the sliding/tilting sunroof which have been closed by the convenience closing function, remain closed if the recirculation push-button was only pressed briefly (t < 1.5 s). In this case, only the fresh air/recirculated air flap is moved to the fresh-air position. The stored positions are cleared when the ignition is switched off.

AUTOMATIC AIR CONDITIONING BOX FUNCTION - GF83.40-P-2105-02GI

Operating condition: Air ducting under heater operation

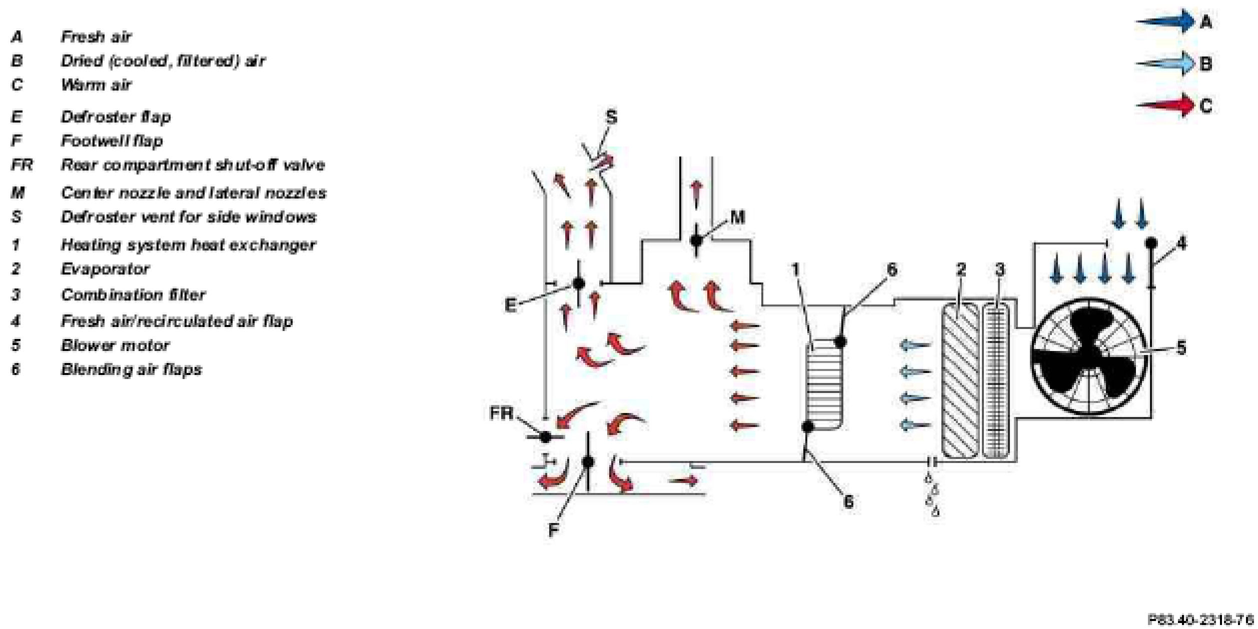


Fig. 73: Identifying Automatic Air Conditioning Box Function - Operating Condition Air Ducting Under Heater Operation

Operating condition: HEATING Function

When in heating mode, the blower motor (5) draws in fresh air (A) to the automatic air conditioning box and routes it through the multipurpose filter (3). The air cleaned by the multipurpose filter (3) is then routed to the evaporator core (2) and dried there. The dried, cooled and filtered air (B) is then routed on through the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The dried, cooled and filtered air (B) is then heated up again in the hot heat exchanger (1). The warm air (C) is routed via the air outlets (E, F, FR, M and S) into the vehicle interior.

The fresh air/recirculated air flap (4) is closed.

Operating condition: Air ducting in cooling mode

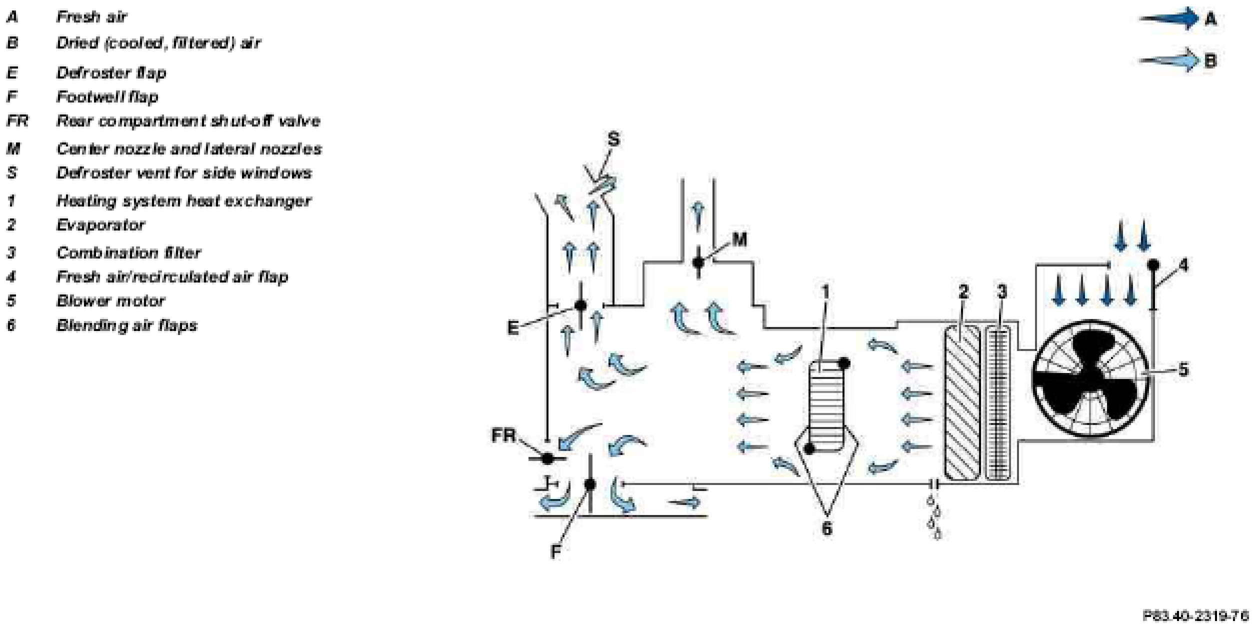


Fig. 74: Identifying Automatic Air Conditioning Box Function - Operating Condition Air Ducting In Cooling Mode

Operating condition: cooling. Function

When in cooling mode, the blower motor (5) draws in fresh air (A) to the automatic air conditioning box and routes it through the multipurpose filter (3). The air cleaned by the multipurpose filter (3) is then routed to the evaporator core (2) and dried there. The dried, cooled and filtered air (B) is then routed around the heat exchanger (1). This air conduction is controlled via the setting of the blending air flaps (6).

The dried, cooled and filtered air (B) is routed directly into the passenger compartment via the air outlets (E, F, FR, M and S). The fresh air/recirculated air flap (4) is closed.

Operating condition: Air ducting in blending mode (hot/cold) closed-loop operation

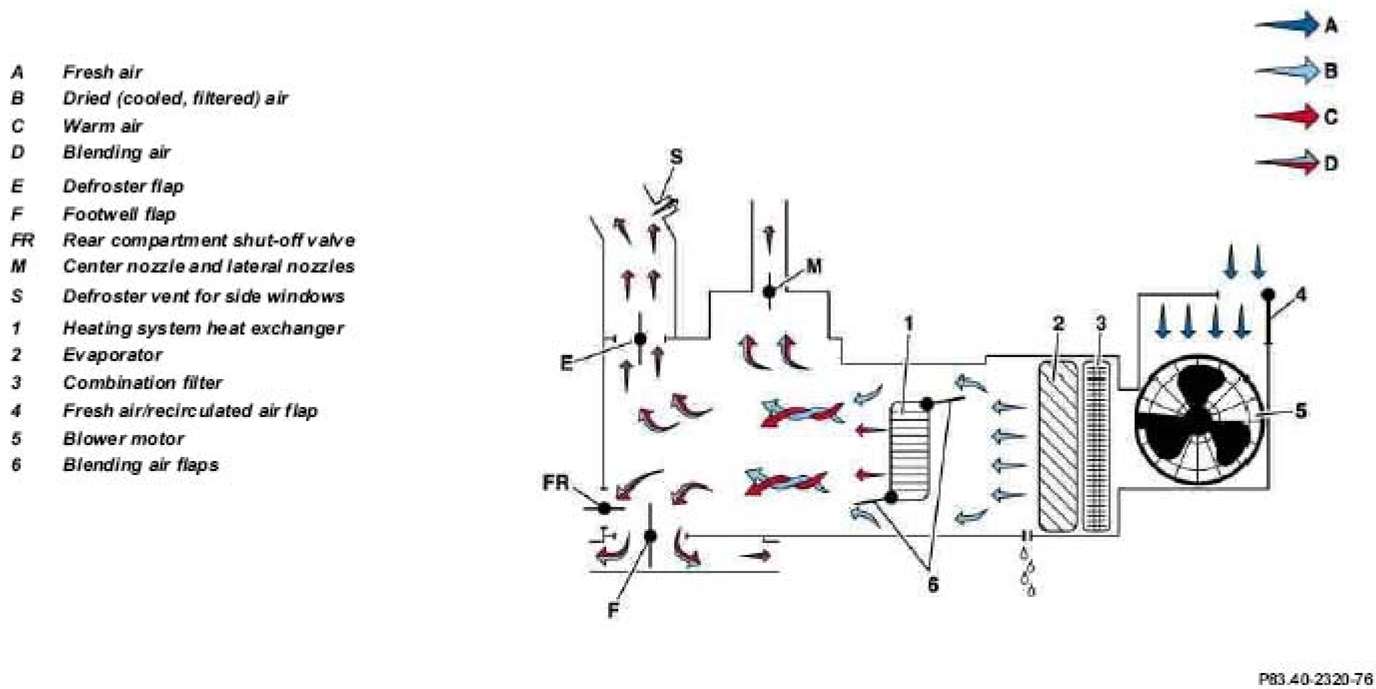


Fig. 75: Identifying Automatic Air Conditioning Box Function - Operating Condition Air Ducting In Blending Mode (Hot/Cold) Closed-Loop Operation

Operating condition: Blend air (warm/cold) Function

When in blending mode, the blower motor (5) draws in fresh air (A) to the automatic air conditioning box and routes it through the multipurpose filter (3). The air cleaned by the multipurpose filter (3) is then routed to the evaporator core (2) and dried there. Some of the dried, cooled and filtered air (B) is routed onwards by the heat exchanger (1) and some is routed around the heat exchanger (1). This air conduction is controlled via the center setting of the blending air flaps (6).

The dried, cooled and filtered air (B) which was routed through the heat exchanger (1) is then heated up again. After passing through the blending air flaps (6) this heated air (C) is mixed up to form blend air (D) with the dried, cooled and filtered air, which was routed around the heat exchanger (1). This blend air (D) is then routed via the air outlets (E, F, FR, M and S) into the passenger compartment. The fresh air/recirculated air flap (4) is closed.

Operating condition: Air ducting "recirculation air" in cooling mode

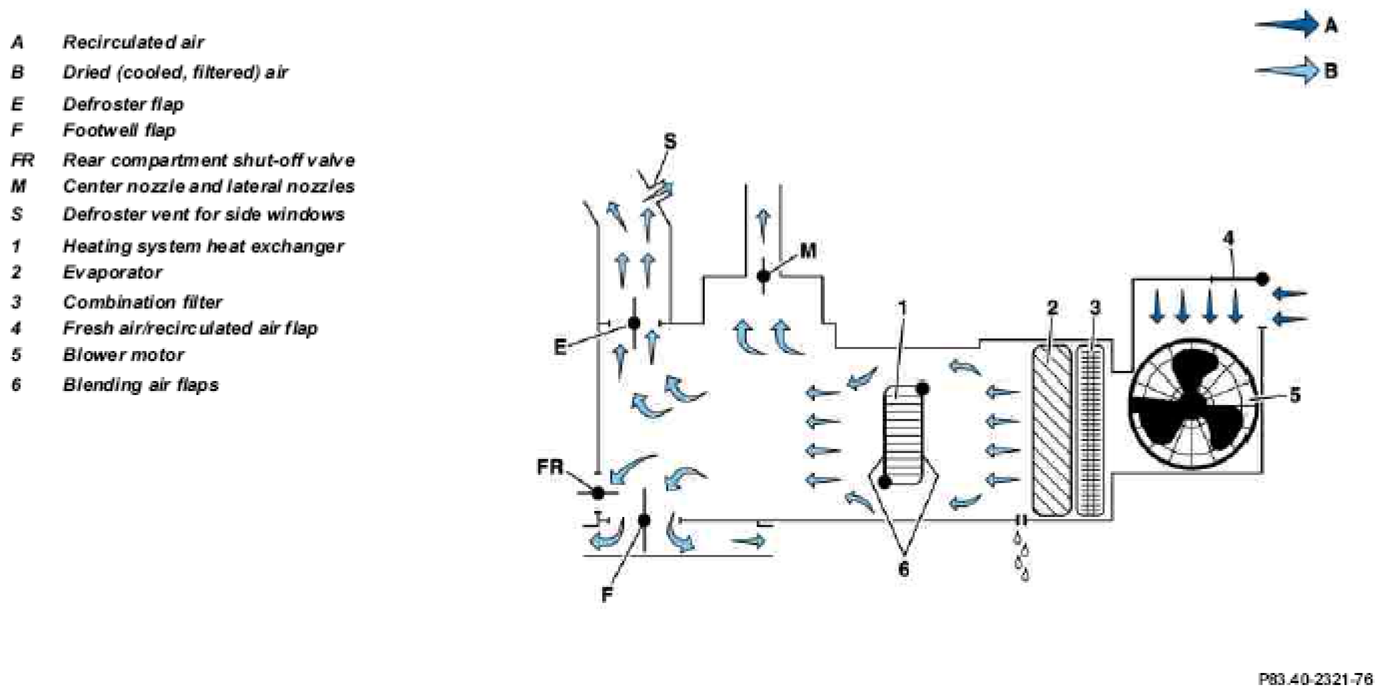


Fig. 76: Identifying Automatic Air Conditioning Box Function - Operating Condition Air Ducting Recirculation Air In Cooling Mode

Operating condition: Cooling down "recirculation air" Function

In cooling mode with recirculated air, the blower motor (5) draws in recirculated air (A) from the passenger compartment via the opened fresh air/recirculated air flap (4) into the automatic air-conditioning box and routes it through the multipurpose filter (3). The air cleaned by the multipurpose filter (3) is then routed to the evaporator core (2) and dried there. The dried, cooled and filtered air (B) is then routed around the heat exchanger (1). This air conduction is controlled via the setting of the blend air flap (6).

The dried, cooled and filtered air (B) is routed directly into the passenger compartment via the air outlets (E, F, FR, M and S). The supply of fresh-air is cut off by the fresh air/recirculation flap (4).

AUTOMATIC AIR CONDITIONING BOX, DESIGN - GF83.40-P-2105-04GI

The automatic air conditioning box consists of the following components

- Air ducting flaps
- Combination filter
- Blower motor
- Blower regulator
- Evaporator
- Heating system heat exchanger
- Expansion valve

- Blending air flap actuator
- Fresh air/recirculated air flap actuator
- Defroster vent flap actuator motor
- Rear shutoff flap actuator motor
- Footwell flap actuator
- Electric heater booster (for engine 612.963 only) and therefore forms a complete unit.

AIR CONDITIONER HOUSING, LOCATION / TASK / DESIGN / FUNCTION - GF83.40-P-2105GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

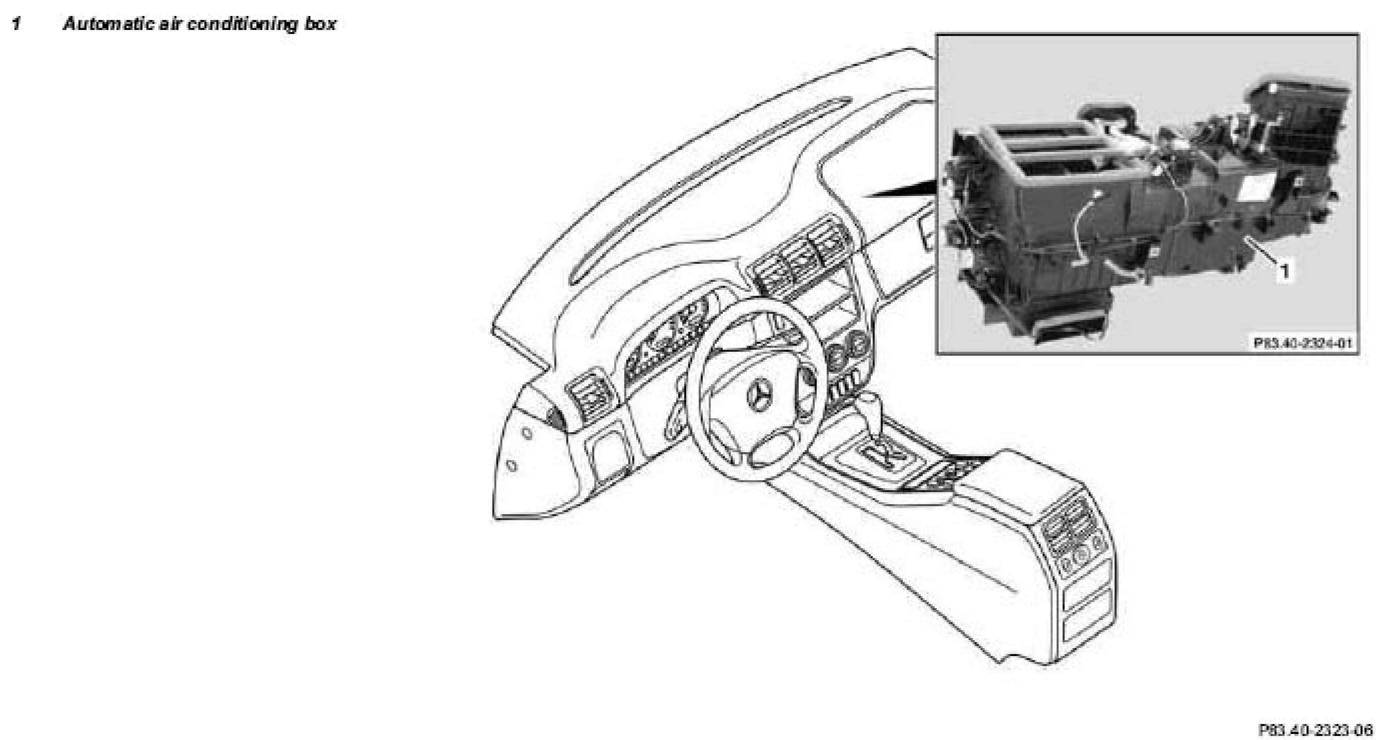


Fig. 77: Identifying Automatic Air Conditioning Box

Automatic air conditioning box, location	The Automatic air conditioning box (1) is below the instrument panel.	
Automatic air conditioning box, purpose	The automatic air conditioning box distributes the air that is required to ventilate the vehicle to the relevant air ducts and vents depending on the interior temperature that is required.	
Automatic air conditioning box, design		GF83.40-P-2105-04GI
Automatic air conditioning box	with engine 112, 113	GF83.40-P-

	function		**2105-02GI**
		Maximum heating mode for vehicles equipped with engine 612.963 only	GF83.40-P-2105-02GJ

AC OFF BUTTON, FUNCTION - GF83.40-P-2107-01GI

Function

When the AC OFF button (AC OFF) on the automatic air conditioning push-button control module is pressed an LED comes on, the refrigerant compressor is switched off and cooling therefore switched off The air is no longer cooled and dried.

Vehicles with diesel engine:

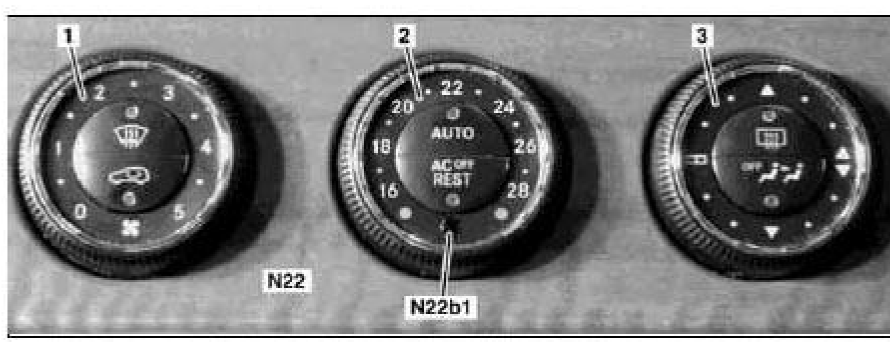
Additionally the electric heater booster is switched off. All other functions are retained.

In order to switch off the refrigerant compressor the push-button control module sends a switch-off request over the CAN. At the same time, the compressor torque value is set to "0". After a specified time delay the refrigerant compressor is switched off.

AC OFF BUTTON, LOCATION/TASK/FUNCTION - GF83.40-P-2107GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

2	*Temperature thumbwheel*
AC OFF	*AC OFF button*



P83.40-2308-04

Fig. 78: Identifying Temperature Thumbwheel And AC OFF Button

	AC OFF button, location	The AC OFF button (AC OFF) is located at the center of the lower half of the temperature selector wheel (2) on the AAC push-button control module (N22).	
	AC OFF button, task	The AC OFF button (AC OFF) serves to switch the automatic air conditioning on and off. Function feedback is by way of a red LED.	
	AC OFF button, function		**GF83.40-P-2107-01GI**

REST BUTTON, FUNCTION - GF83.40-P-2109-01GI

Function

Pressing the reset button (i) on the AAC push-button control module (N22) switches on the residual engine heat utilization system. When the engine is switched off, the residual heat heats the vehicle depending on the temperature setting on the AAC push-button control panel (N22) and the ambient temperature in the vehicle interior. The vehicle can be heated for approx. 30 min, with the engine switched off. The function is only available with the ignition switched off or in position 1. If there is low voltage, the residual heat function is automatically switched off.

The flaps are in automatic mode and the quantity of air is also automatically regulated.

The residual heat function is switched off,

- if the electronic key is moved to position 2 in the starter switch,
- after approx. 30 minutes,
- if the battery voltage drops below 11V.

AUXILIARY FAN, FUNCTION - GF83.40-P-2115-01GH

Function

Depending on the refrigerant pressure and/or the coolant temperature the left auxiliary fan (M4m1), right auxiliary fan (M4m2) are actuated.

The all-activity module (AAM) (N10) receives the coolant temperature from the coolant temperature sensor and the refrigerant pressure from the refrigerant pressure sensor (B12).

The all-activity module (AAM) (N10) compares this input information with stored values and actuates the left auxiliary fan (M4m1), right auxiliary fan (M4m2).

When the following values are indicated the left auxiliary fan (M4m1), right auxiliary fan (M4m2) are switched on or off:

- refrigerant pressure >16 bar = auxiliary fan ON
- refrigerant pressure < 12 bar = auxiliary fan OFF
- coolant temperature > 105°C = auxiliary fan ON
- coolant temperature < 94°C = auxiliary fan OFF

AUXILIARY FAN, FUNCTION - GF83.40-P-2115-01GI

Function

Depending on the refrigerant pressure and/or the coolant temperature the left auxiliary fan (M4m1) and the right auxiliary fan (M4m2) are actuated.

The all-activity module (AAM) (N10) receives the coolant temperature by the coolant temperature sensor (B11/4) and the refrigerant pressure by the refrigerant pressure and temperature sensor (B12/2). The all-activity module (AAM) (N10) compares this input information with stored values and actuates the left auxiliary fan (M4m1) and the right auxiliary fan (M4m2).

When the following values are indicated the left auxiliary fan (M4m1), right auxiliary fan (M4m2) are switched on or off:

- refrigerant pressure >16 bar = auxiliary fan **ON**
- refrigerant pressure <13 bar = auxiliary fan **OFF**
- coolant temperature > 105°C = auxiliary fan **ON**
- coolant temperature < 97°C = auxiliary fan **OFF**

AUXILIARY FAN, LOCATION - GF83.40-P-2115-02GH

The auxiliary fans are located (M4) directly in front of the condenser.

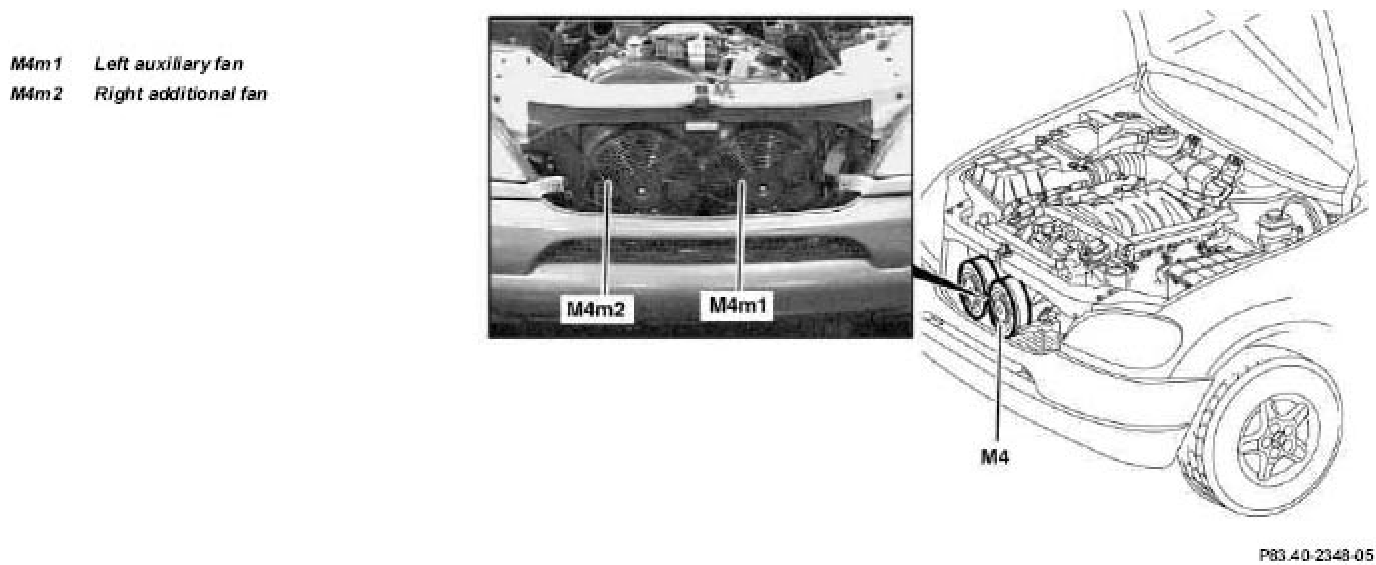


Fig. 79: Identifying Left Auxiliary Fan And Right Additional Fan

ENGINE/AIR CONDITIONING ELECTRIC FAN, FUNCTION - GF83.40-P-2118-01GH

Function

Depending on the refrigerant pressure and/or the coolant temperature the fan speed is increased infinitely.

Engines 612.963 and 628.963

The CDI control module (N3/9) receives the coolant temperature from the coolant temperature sensor and via the all-activity module (AAM) (N10) via the CAN bus the refrigerant pressure from the refrigerant pressure sensor (B12).

This input information is relayed by the CDI control module (N3/9) to the integrated control module of the electric engine/AC intake fan with integrated control (M4/7).

Engines 113.942 and 113.981

The all-activity module (AAM) (N10) receives the coolant temperature via the coolant temperature sensor and the refrigerant pressure via the refrigerant pressure sensor (B12).

This input information is relayed by the all-activity module (AAM) (N10) to the integrated control module of the engine and AC electric suction fan with integrated control (M4/7)

There the input information is compared with the stored values and, if necessary, the speed of the engine and AC electric suction fan with integrated control (M4/7) is increased to 100 %.

The engine and AC electric suction fan with integrated control (M4/7) operates with AC switched on and in the reheat mode for basic ventilation with a capacity of up to 20 %.

The basic ventilation can be switched off under the following conditions:

- At an outdoor temperature of < or = 15°C the value of the outdoor temperature is transmitted from the outside temperature sensor (B10/5) to the AC control module (N19).

  The pressure-dependent fan speed remains the same.

- At a vehicle speed of > 75 km/h

  The vehicle speed value comes from the traction system control module via the instrument cluster (A1) and CDI control module (N3/9), to the control module integrated in the electric suction fan engine and AC with integrated control (M4/7). The pressure-dependent fan speed remains the same.

An overrun time of 60 s can be set in order to ensure that the engine and AC electric suction fan with integrated control (M4/7) will continue to operate even where the refrigerant compressor is temporarily switched off by the icing protection.

The engine and AC electric suction fan with integrated control (M4/7) has a power rating of 550W.

ELECTRIC FAN, ENGINE/AIR CONDITIONING, LOCATION - GF83.40-P-2118-02GH

The engine and AC electric suction fan with integrated control (M4/7) is located immediately in front of the condenser.

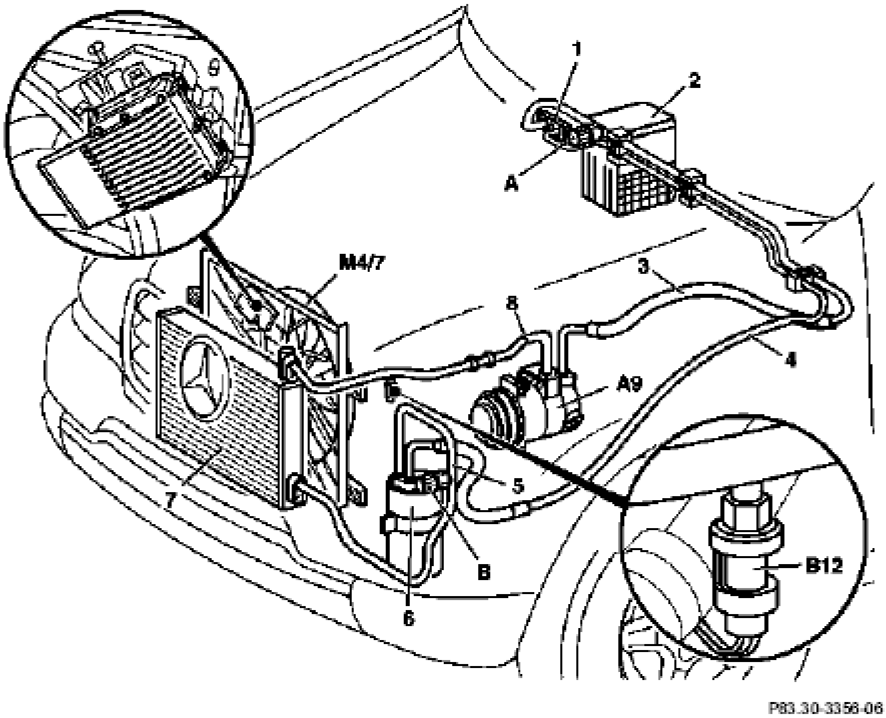


Fig. 80: Identifying AC Electric Suction Fan With Integrated Control

CONDENSER FUNCTION - GF83.40-P-2120-01GC

Function

The hot, gaseous refrigerant routed into the condenser passes the heat (compression heat) to the coiled pipes and slats. These then very quickly absorb the refrigerant's heat and transmit the heat to the outside air passing through. This in turn cools the refrigerant.

By cooling down, the refrigerant is liquefied (condensed). The liquid heat refrigerant is then carried away from the condenser and flows into the fluid reservoir.

CONDENSER, LOCATION - GF83.40-P-2120-02GH

The condenser (7) is located directly in front of the radiator.

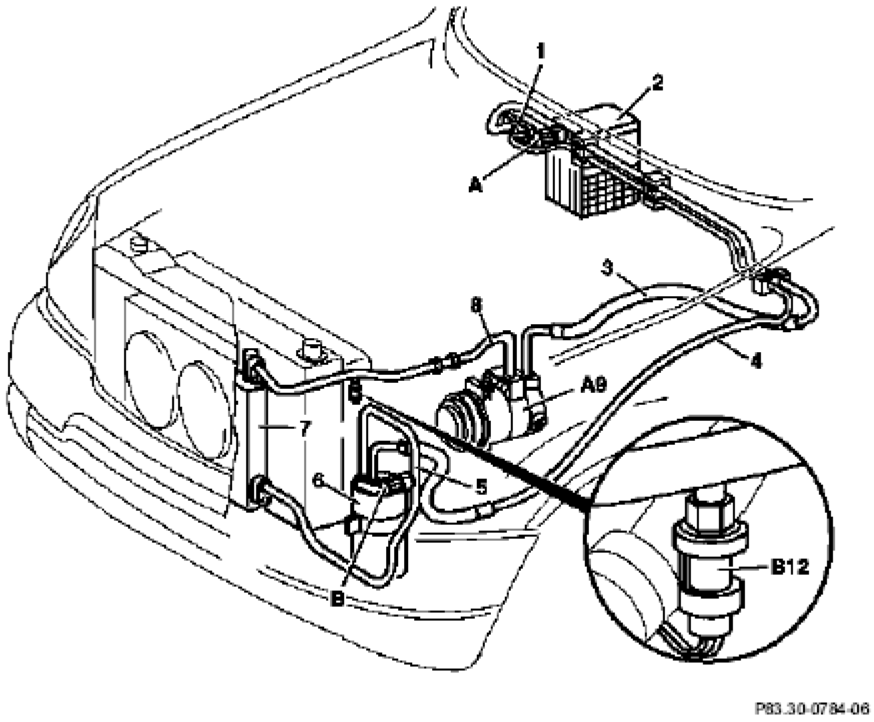


Fig. 81: Identifying Condenser

EVAPORATOR, FUNCTION - GF83.40-P-2121-01GC

Function

The refrigerant, which is under high pressure, is injected into the evaporator. The evaporator is a disk-type evaporator made of soldered semicircular disks with louvered corrugated fins by the Valeo company for model 168 and the Denso company for model 163.

The heat that is required for evaporation is extracted from the air flowing past the evaporator, which cools down. The soldered semicircular disks with louvered corrugated fins or slats provide a large evaporation surface and guarantee rapid heat exchange.

The moisture that condenses when the air cools is led to the outside via condensation drain hoses.

The condensation also binds the solids in the air and therefore cleans it.

EVAPORATOR, LOCATION - GF83.40-P-2121-02GH

The evaporator (1) is located in the air conditioning box.

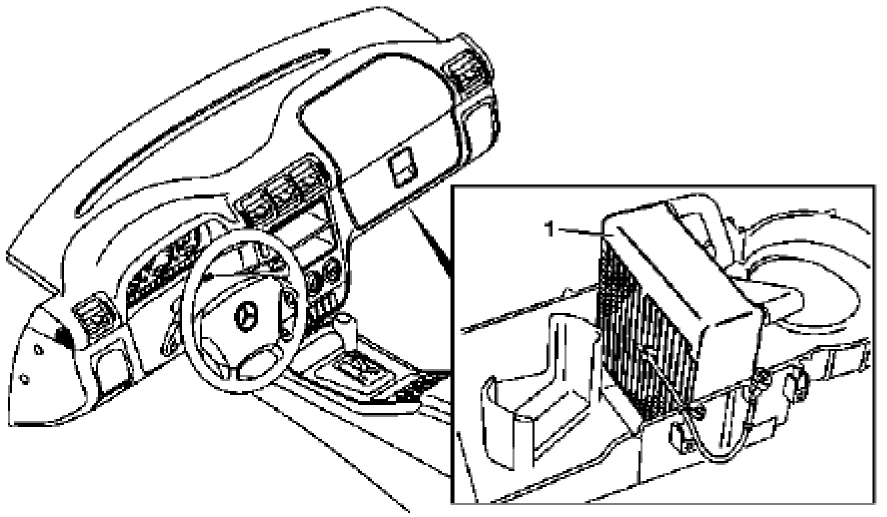


Fig. 82: Locating Evaporator

EVAPORATOR, LOCATION/PURPOSE/DESIGN/FUNCTION - GF83.40-P-2121GC

MODELS 163, up to 31.8.01, 168 with code (580) Air conditioning or Tempmatic for USA

MODELS 163 as of 1.9.01 with code (580a) Automatic air conditioning

Evaporator, location	Model 168 Model 163	GF83.40-P-2121-02GC **GF83.40-P-2121-02GH**
Evaporator, purpose	The evaporator is used to cool, dehumidify and clean the interior air.	
Evaporator, design	The evaporator is a disk-type evaporator made of soldered semicircular disks with louvered corrugated fins.	
Evaporator, function		**GF83.40-P-2121-01GC**

FLUID RESERVOIR FUNCTION - GF83.40-P-2122-01GI

Function

The liquefied refrigerant enters the fluid reservoir under pressure and flows through a stainless-steel fabric layer to the filter block. The filter block's pores are matched exactly to the molecular size of the refrigerant. Thus the refrigerant can flow through the filter block.

All other matter, primarily water, is held back by this molecular filter and deposited. The cleansed refrigerant then flows through a rising pipe to the expansion valve.

Whenever the system is opened, the fluid reservoir should be replaced because of the water which has collected there in the meantime.

EXPANSION VALVE, FUNCTION - GF83.40-P-2123-01GC

Function

When the refrigerant compressor is switched on the pressure in the evaporator drops, thereby causing the diaphragm (1) to curve downwards. The control valve (3) follows the movement of the diaphragm and presses the ball (4) out of its seating against the spring (5). The opened valve enables the refrigerant to be sprayed into the evaporator.

As the diaphragm movement (1) is dependent on both the intake pressure and the temperature at the evaporator outlet, only the specific quantity of refrigerant, as required for optimum vaporization, is injected.

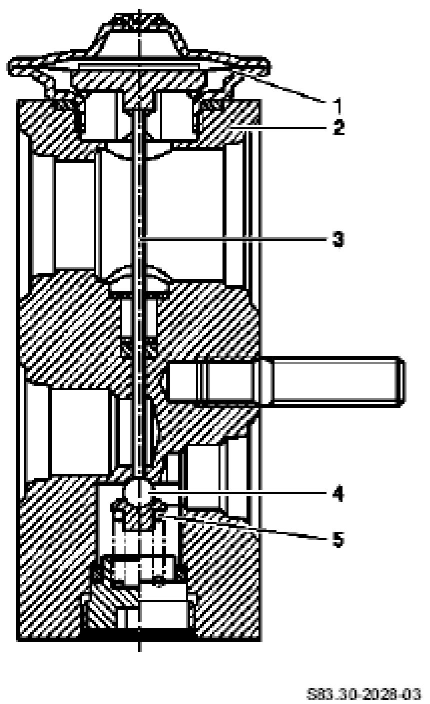


Fig. 83: Identifying Expansion Valve Components

EXPANSION VALVE, LOCATION - GF83.40-P-2123-02GH

The expansion valve (1) is located on the right at the rear in the engine compartment next to the battery.

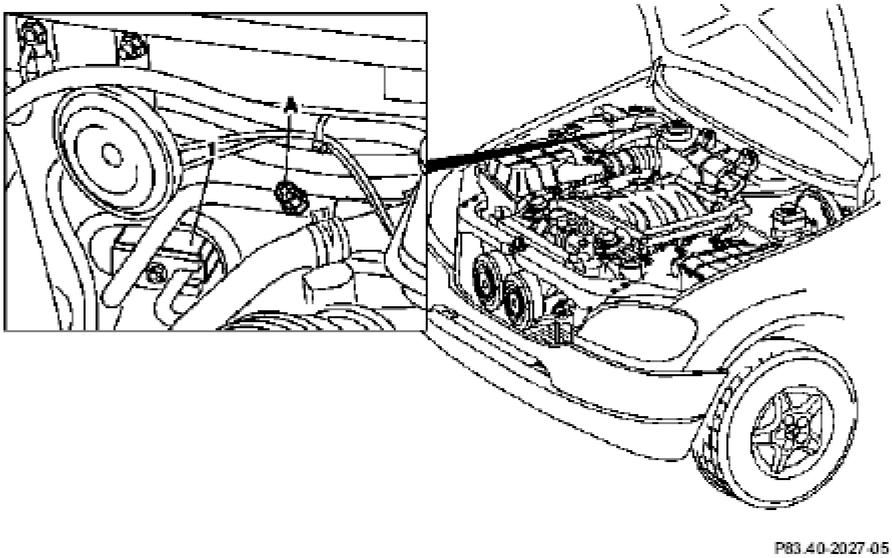


Fig. 84: Locating Expansion Valve

EXPANSION VALVE, LOCATION/TASK/DESIGN/FUNCTION - GF83.40-P-2123GC

MODEL 163 up to 31.08.01, 168 with CODE (580) Air conditioning or Tempmatic for USA

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

Design

1 *Diaphragm*
2 *Aluminum housing*
3 *Control valve*
4 *Ball*
5 *Spring*

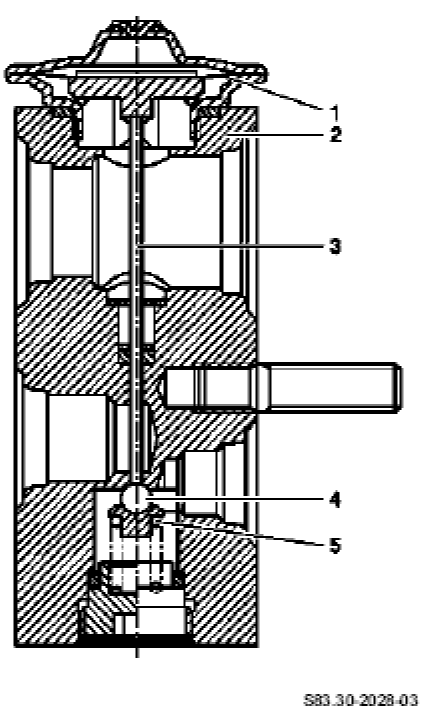


Fig. 85: Identifying Expansion Valve Design

Expansion valve, location	Model 168	GF83.40-P-2123-02GC
	Model 163	**GF83.40-P-2123-02GH**
Expansion valve, task	The expansion valve injects the liquid refrigerant into the evaporator.	
Expansion valve, function		**GF83.40-P-2123-01GC**

REFRIGERANT PRESSURE SENSOR, FUNCTION - GF83.40-P-2126-01GH

Function

Shutting off the refrigerant compressor

The refrigerant pressure sensor (B12) sends the current value to the All Activity Module (N10). The All Activity Module (N10) compares this input information with stored values and actuates the refrigerant compressor.

At the following values, the refrigerant compressor is switched on or off:

- refrigerant pressure > 3 bar = refrigerant compressor **ON**
- refrigerant pressure < 2 bar = refrigerant compressor **OFF**
- refrigerant pressure < 26 bar = refrigerant compressor **ON**
- refrigerant pressure > 30 bar = refrigerant compressor **OFF**

Cut-in of the auxiliary fan (engines 111.977 and 112.942)

The pressure value received from the refrigerant pressure sensor (B12) is recorded by the All Activity Module (N10) and compared there with a stored value.

As of 12/99, the Extended Activity Module (EAM, N10/1) assumes this task from the All Activity Module (N10).

At the following values, the auxiliary fan (M4m1, M4m2) is switched on or off:

- refrigerant pressure > 16 bar = auxiliary fan **ON**
- refrigerant pressure <12 bar = auxiliary fan **OFF**

Cut-in of the electric fan for engine/AC (engines 113.942/981 and 612.963)

The pressure value received from the refrigerant pressure sensor (B12) is recorded by the All Activity Module (N10), sent to the control module integrated in the electric fan for engine/AC and compared there with a stored

value.

At the following values the electric fan for engine/AC (M4/7) is switched on or off:

- refrigerant pressure > 20 bar = electric fan for engine/AC **ON**
- refrigerant pressure <12 bar = electric fan for engine/AC **OFF**

REFRIGERANT PRESSURE SENSOR, LOCATION - GF83.40-P-2126-02GH

The refrigerant pressure sensor (B12) is located at the front left in the engine compartment at the high-pressure line (8) between the refrigerant compressor (A9) and the capacitor (7).

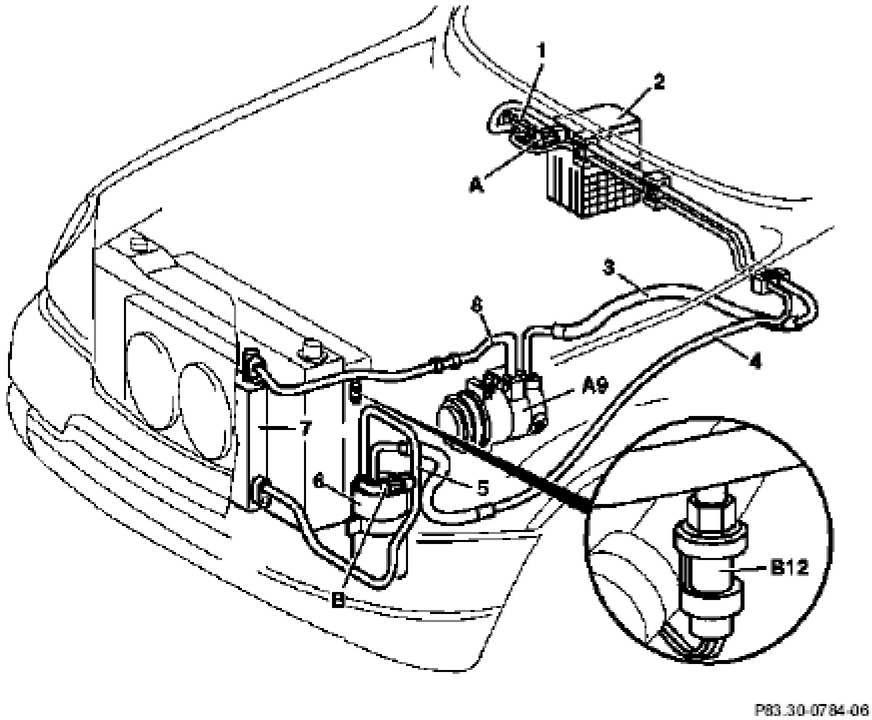


Fig. 86: Identifying Refrigerant Pressure Sensor

DEFROSTER BUTTON, FUNCTION - GF83.40-P-2139-02GI

Function

Pressing the defroster button ( ) initiates the defrost function.

Function feedback takes place by means of a yellow LED.

The defrost function works according to the following logic:

- the heating power is regulated using the outside temperature
- the entire air flow is directed at the windshield and the front side windows, and the defroster nozzles are

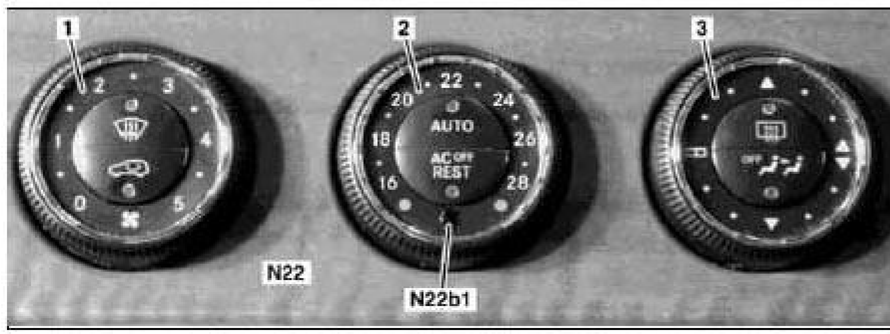
opened.

- the injected air is dehumidified, Reheat mode
- blend air flaps controlled
- footwell nozzles closed

DEFROSTER BUTTON, LOCATION / TASK / FUNCTION - GF83.40-P-2139GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

1 Blower switch
Defroster button



P83.40-2308-04

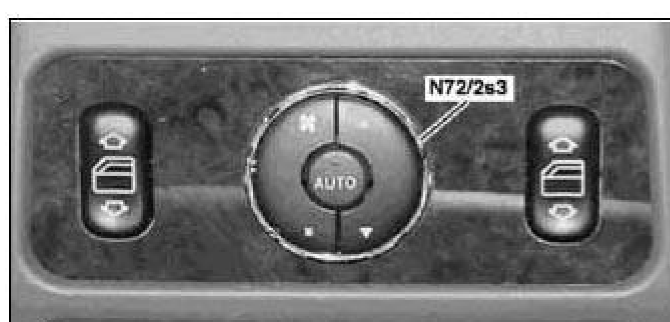
Fig. 87: Identifying Blower Switch And Defroster Button

	Defroster button, location	The defroster button ( ) is located in the center in the upper half of the blower switch (1) on the AAC push-button control module (N22).	
	Defroster button, purpose	The defroster button ( ) starts the defroster function.	
	Defroster button, function		GF83.40-P-2139-02GI

BLOWER BUTTON POSITION/TASK/FUNCTION - GF83.40-P-2144GI

MODEL 163 as of 01.09 01 with CODE (580a) Automatic air conditioning in the rear ventilation control panel

Blower button



P83.40-2309-10

Fig. 88: Identifying Blower Button

Blower button, location	The blower button ( ) is located in the center in the rear ventilation control panel.	
Blower button, task	The blower button ( ) is used to cut in the blower motor for fresh air and recirculating air operation.	
Blower button, function		**GF83.40-P-2100-01GI**

RECIRCULATING AIR PUSH-BUTTON, LOCATION/TASK/FUNCTION - GF83.40-P-2145GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

1 Blower switch

Recirculating air pushbutton

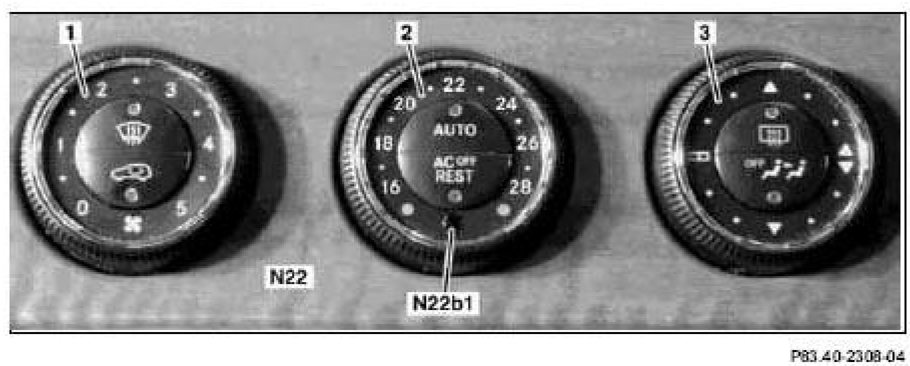


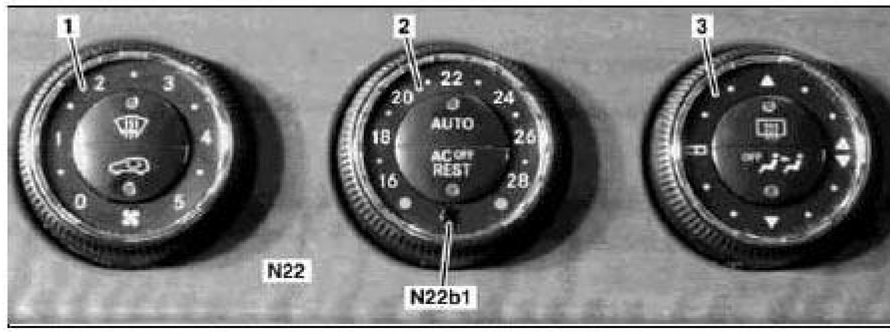
Fig. 89: Identifying Recirculating Air Push-button And Blower Switch

Recirculating air push-button, position	The recirculating air push-button ( ) is located in the center in the lower half of the blower switch (1) on the AAC push-button control module (N22).	
Recirculating air push-button, task	The recirculating air push-button ( ) is used to operate the fresh air/recirculated air flap to permit air to be directed out of the vehicle interior. Function feedback takes place by means of a red LED.	
Recirculating air push-button, function		**GF83.40-P-2102-01GI**

AUTO BUTTON, LOCATION / TASK / FUNCTION - GF83.40-P-2147GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

2	*Temperature thumbwheel*
AUTO	*Auto button*



P83.40-2308-04

Fig. 90: Identifying Auto Button And Temperature Thumbwheel

Auto button, location	The auto button (AUTO) is located in the center in the upper half of the temperature selector wheel (2) on the AAC push-button control module (N22).
Auto button, purpose	By pressing the auto button (AUTO) automatic switching is activated. Function feedback takes place by means of a red LED.
Auto button, function	In addition to regulating the temperature, the blower speed and the air distribution are also regulated automatically in automatic mode. The blower speed is continuously controlled depending on the temperature difference between the specified and actual values.

AUTO BUTTON, LOCATION / TASK / FUNCTION - GF83.40-P-2147GJ

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning in the rear ventilation control panel

AUTO	*Auto button*



P83.40-2309-10

Fig. 91: Identifying Auto Button

Auto button, location	The auto button (AUTO) is located in the center in the rear ventilation control panel (N72/2s3).
Auto button, purpose	By pressing the auto button (AUTO) automatic switching is activated. Function feedback takes place by means of a red LED.

Auto button, function	Pressing the Auto button (AUTO) enables the air quantity and the air distribution for the rear area to be controlled automatically by the AAC push-button control module (N22).

RESIDUAL HEAT BUTTON, LOCATION / TASK / FUNCTION - GF83.40-P-2148GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

2 Temperature thumbwheel

REST — REST button (residual engine heat utilization), is combined with the AC OFF button

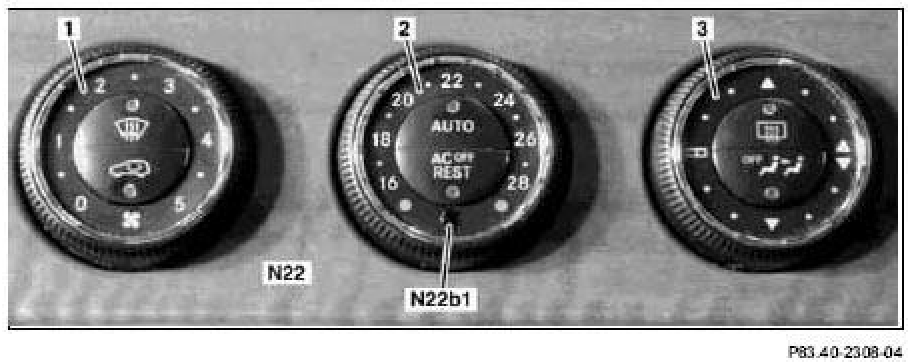


Fig. 92: Identifying Residual Heat Button

REST button, location	The REST button (i) is located in the center in the lower half of the temperature selector wheel (2) on the AAC push-button control module (N22) and is combined with the AC OFF button (AC OFF).	
REST button, purpose	The REST button (i) is used to switch the residual engine heat utilization system on and off. Function feedback takes place by means of a red LED.	
REST button, function		**GF83.40-P-2109-01GI**

ELECTRIC FAN ENGINE/AIR CONDITIONING SYSTEM, LOCATION/PURPOSE/FUNCTION - GF83.40-P-2151GH

MODEL 163 up to 31.8.01 with ENGINE 113.942 /981, 612.963, 628.963

Electric fan, engine/air conditioning		**GF83.40-P-2118-02GH**
Electric fan, engine/air conditioning, purpose	The electric suction fan engine and AC with integrated control (M4/7) serves to cool down the coolant and the refrigerant.	
Engine/air conditioning electric fan, function		**GF83.40-P-2118-01GH**

CONDENSER LOCATION/TASK/FUNCTION - GF83.40-P-2152GC

MODELS 163, up to 31.8.01, 168 with CODE (580) Air conditioning or Tempmatic for USA

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

Condenser, location	Model 168 Model 163	GF83.40-P-2120-02GC **GF83.40-P-2120-02GH**
Condenser task	The condenser ensures that the state of the refrigerant coming from the compressor changes from gaseous to liquid.	
Condenser function		**GF83.40-P-2120-01GC**

FLUID RESERVOIR, LOCATION/PURPOSE/FUNCTION - GF83.40-P-2153GI

MODEL 163 (except 163.128) as of 1.9.01 with CODE (580a) Automatic air conditioning

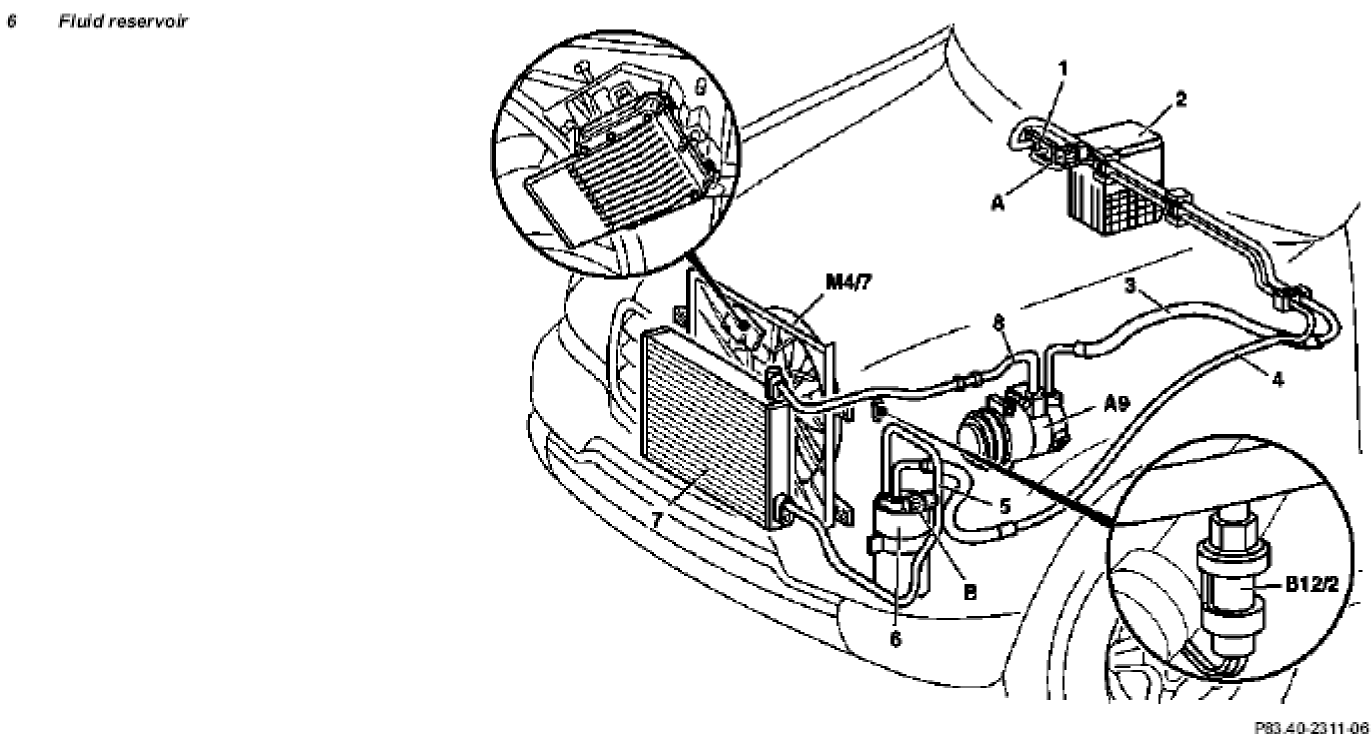


Fig. 93: Identifying Fluid Reservoir

Receiver position	The fluid reservoir is located in the engine compartment on the left front next to the condenser	
Fluid reservoir, purpose	- Filtering chemical and mechanical impurities out of the refrigerant - Volume reservoir for the refrigerant	

	• Draining the refrigerant	
Receiver, function		**GF83.40-P-2122-01GI**

REFRIGERANT PRESSURE SENSOR, LOCATION/TASK/FUNCTION - GF83.40-P-2156GH

MODEL 163 up to 31.08.01 with CODE (580) Air conditioning or Tempmatic for USA

Refrigerant pressure sensor, location		**GF83.40-P-2126-02GH**
Refrigerant pressure sensor, task	The refrigerant pressure sensor (B12) detects the refrigerant pressure and sends it to the All Activity Module.	
Refrigerant pressure sensor, function		**GF83.40-P-2126-01GH**

AIR DISTRIBUTION BUTTON, LOCATION/TASK/FUNCTION - GF83.40-P-2159GI

MODEL 163 as of 01.09 01 with CODE (580a) Automatic air conditioning in the rear ventilation control panel



Fig. 94: Identifying Air Distribution Button

Air distribution button, location	The air distribution button (▲ ▼) is located in the center in the rear ventilation control panel (N72/2s3).	
Air distribution button, task	The air distribution button (▲ ▼) controls the air distribution to the rear area nozzle and the rear legroom air outlets for ventilating the rear area.	
Air distribution push-button function		**GF83.40-P-2101-01GI**

AUXILIARY FAN, LOCATION/PURPOSE/FUNCTION - GF83.40-P-2162GH

MODEL 163 up to 31.8.01 with ENGINE 111.977,112.942 /970 with CODE (580) Air conditioning or Tempmatic for USA

MODEL 163 as of 1.9.01 with ENGINE 112.942 /970 with CODE (580a) Automatic air conditioning

Auxiliary fan, location		**GF83.40-P-2115-02GH**
Auxiliary fan, purpose	The left auxiliary fan (M4m1) and right auxiliary fan (M4m2) serve for cooling the coolant and the refrigerant.	
Auxiliary fan, function	up to 31.08.01	**GF83.40-P-2115-01GH**
	as of 1.09.01	**GF83.40-P-2115-01GI**

REFRIGERANT PRESSURE AND TEMPERATURE SENSOR, FUNCTION - GF83.40-P-2171-01GI

Detecting the refrigerant pressure

The refrigerant pressure and temperature sensor (B12/2) detects the refrigerant pressure and sends the determined value via the CAN-BUS to the AAC push-button control module (N22). This value is compared with a stored temperature/pressure curve.

The refrigerant pressure and temperature sensor (B12/2) operates in a pressure value range of from 0 to 35 bar.

Shutting of the refrigerant compressor

At the following values, the refrigerant compressor is switched off.

- refrigerant pressure < 1.75 bar = refrigerant compressor OFF
- refrigerant pressure > 30 bar = refrigerant compressor OFF

Switching on the refrigerant compressor

The refrigerant compressor is switched on at the following value

- refrigerant pressure > 2.25 bar = refrigerant compressor ON

Detecting the refrigerant temperature

The refrigerant pressure and temperature sensor (B12/2) detects the temperature of the refrigerant and sends the determined value via the CAN-BUS to the AAC push-button control module (N22). This value is compared with a stored temperature/pressure curve and the refrigerant level is determined as a result.

With a refrigerant level that is too low, the refrigerant compressor is switched off by the AAC push-button control module (N22) via the CAN-BUS.

The AC OFF mode is activated and can no longer be quit. Only when the error has been eliminated and the diagnostic trouble code memory in the AAC push-button control module (N22) has been erased will the system be operational again.

The refrigerant pressure and temperature sensor (B12/2) operates in a temperature value range of from -10°C to +90°C.

Cut-in of electric suction-type fan for engine and AC with integrated control (M4/7)

At the following values the electric suction-type fan for engine and AC with integrated control (M4/7) is actuated:

- refrigerant pressure < 14 bar = fan OFF
- Refrigerant pressure > 20 bar = fan ON (100 %)
- refrigerant pressure 14 to 20 bar = Continuous linear increase in fan speed (20 -100 %)

REFRIGERANT PRESSURE AND TEMPERATURE SENSOR POSITION/TASK/FUNCTION - GF83.40-P-2171GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

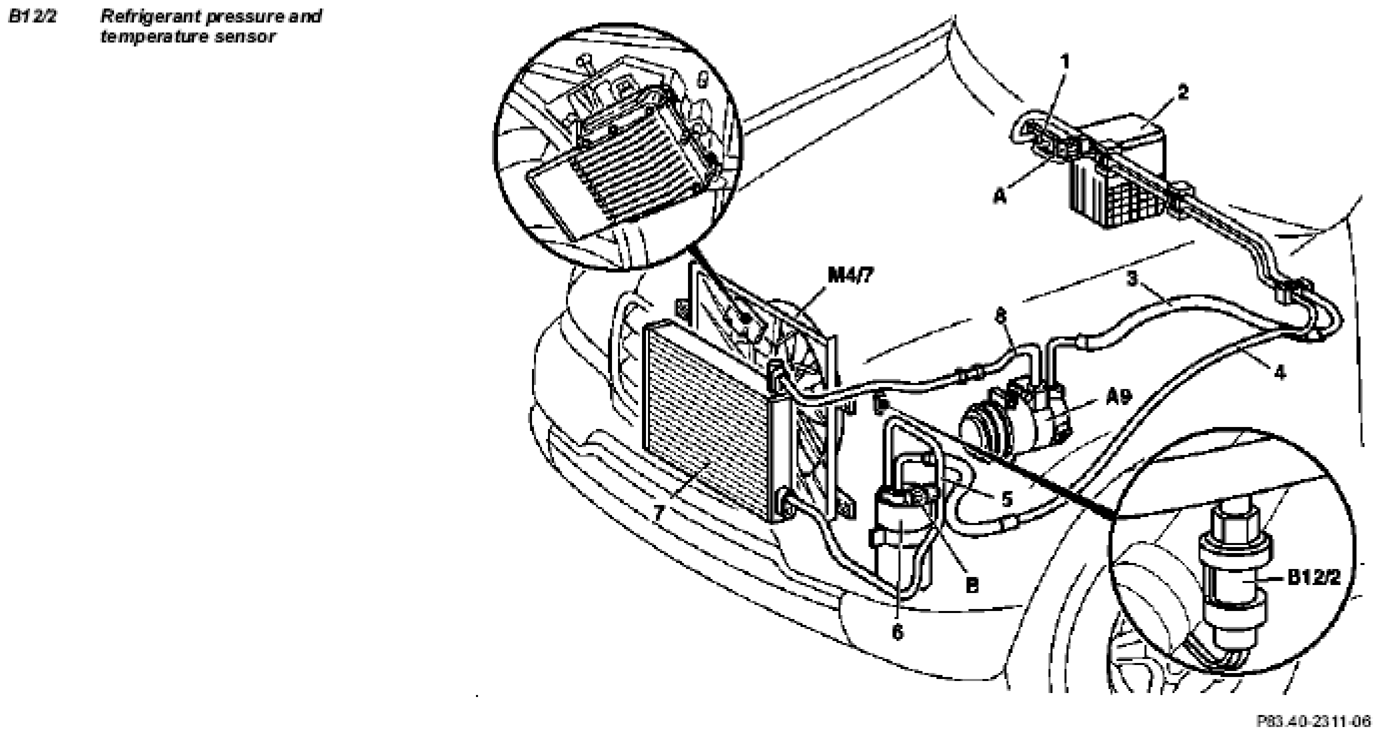


Fig. 95: Identifying Refrigerant Pressure And Temperature Sensor

Refrigerant pressure and temperature sensor, location	The refrigerant pressure sensor (B12/2) is located at the front left in the engine compartment at the high-pressure line (8) between the refrigerant compressor (A9) and the capacitor (7).	
Refrigerant pressure and temperature sensor, task	The refrigerant pressure and temperature sensor (B12/1) detects the refrigerant pressure and the refrigerant temperature and sends these values to the AAC push-button control module (N22).	
Refrigerant pressure		

and temperature sensor, function		GF83.40-P-2171-01GI

ENGINE AND AC ELECTRIC SUCTION FAN WITH INTEGRATED CONTROL, FUNCTION - GF83.40-P-2172-01GI

Function

Depending on the refrigerant pressure and/or on the coolant temperature the speed of the engine and AC electric suction fan with integrated control (M4/7) is increased infinitely.

The engine and AC electric suction fan with integrated control (M4/7) receives the coolant temperature from the coolant temperature sensor (B11/4) and the refrigerant pressure from the refrigerant pressure and temperature sensor (B12/2).

This input information is compared by the engine and AC electric suction fan with integrated control (M4/7) with the stored values and, if necessary, the speed of the engine and AC electric suction fan is increased to 100 %

The engine and AC electric suction fan with integrated control (M4/7) operates with AC switched on and in the reheat mode for basic ventilation with a capacity of up to 20 %.

The basic ventilation can be switched off under the following conditions:

- At an outside temperature of < or = 15°C.

  The pressure-dependent fan speed remains the same.

- At a driving speed of > 75 km/h.

  The pressure-dependent fan speed remains the same.

An overrun time of 60 s can be set in order to ensure that the engine and AC electric suction fan with integrated control (M4/7) will continue to operate even where the refrigerant compressor is temporarily switched off by the icing protection.

The engine and AC electric suction fan with integrated control (M4/7) has a power rating of 850 W.

ELECTRIC SUCTION-TYPE FAN FOR ENGINE AND AC WITH INTEGRATED CONTROL, LOCATION/TASK/FUNCTION - GF83.40-P-2172GI

MODEL 163 as of 1.9.01 with ENGINE 113.965 /981, 612.963, 628.963 with CODE (580a) Automatic air conditioning

MODEL 163 as of 1.9.01 up to 31.8.02 with ENGINE 113.942 with CODE (580a) Automatic air conditioning

M4/7 *Electric suction-type fan for engine and AC with integrated control*

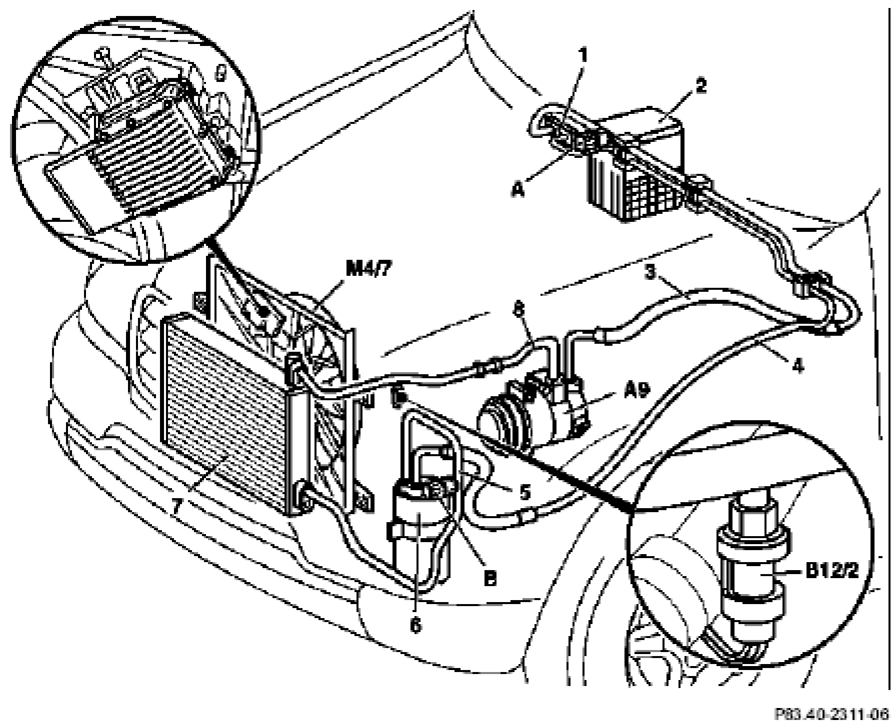


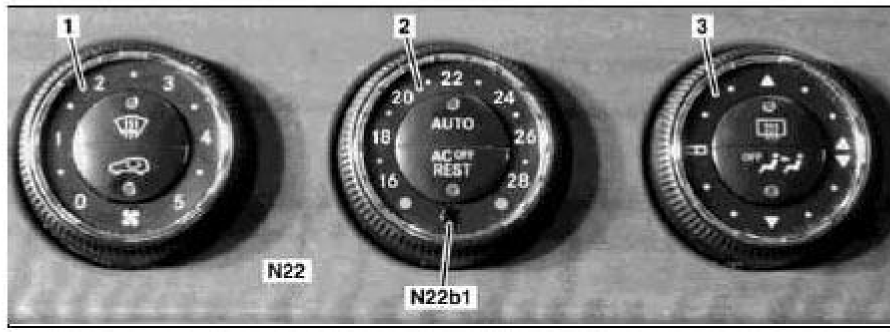
Fig. 96: Identifying Electric Suction-Type Fan For Engine And AC With Integrated Control

	Electric suction-type fan for engine and AC with integrated control, location		
	Electric suction-type fan for engine and AC with integrated control, task	The electric suction-type fan for engine and AC with integrated control (M4/7) is used to cool down the coolant and the refrigerant.	
	Electric suction-type fan for engine and AC with integrated control, function		**GF83.40-P-2172-01GI**

BUTTON FOR REAR AREA AIR DISTRIBUTION, LOCATION/TASK/FUNCTION - GF83.40-P-2173GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

3	*Air distribution switch*
	Button for rear area air distribution



P83.40-2308-04

Fig. 97: Identifying Button For Rear Area Air Distribution And Air Distribution Switch

Button for rear area air distribution, location	The button for rear area air distribution ( ) is located in the center in the lower half of the air distribution switch (3) on the AAC push-button control module (N22).
Button for rear area air distribution, task	The button for rear area air distribution ( ) blocks the rear blow-out ducts for ventilation.
Button for rear area air distribution, function	By pressing the button for rear area air distribution ( ) the rear air distribution flap actuator motor (M2/21) is actuated and thus the air supply to the air duct for rear area ventilation is closed. Function feedback takes place by means of a red LED.

SURVEY OF AUTOMATIC AIR CONDITIONING SYSTEM COMPONENTS, LOCATION/PURPOSE/DESIGN/FUNCTION - GF83.40-P-9990GI

MODEL 163 as of 1.9.01 with code (580a) Automatic air conditioning

Air inlet, location/function		GF83.10-P-2138GC
Air ducts, location/purpose/design		GF83.10-P-2139GH
Rear vent, location/purpose/function		GF83.10-P-2143GC
Defroster vent, location/purpose/function		GF83.10-P-2144GC
Center nozzle, location/purpose/function		GF83.10-P-2149GC
Lateral nozzle, location/purpose/function		GF83.10-P-2150GC
Rear nozzle, location/purpose/design/function		GF83.10-P-2151GI
Front footwell air outlet, location/purpose/function		GF83.10-P-2145GC
Rear footwell air outlet, location/purpose/		GF83.10-P-

function		2146GI
Blower motor, location/purpose/design/function		GF83.10-P-2170GI
Blower regulator, location/purpose/function		GF83.10-P-2141GI
Rear blower motor, location/purpose/design/function		GF83.10-P-2168GI
Rear electronic blower regulator, location/purpose/function		GF83.10-P-2176GI
Combination filter, location/purpose/function		GF83.10-P-2128GI
Defroster vent flap actuator motor, location/purpose/function		GF83.10-P-2175GI
Footwell flap actuator, location/purpose/function		GF83.10-P-2132GI
Actuator motor, center nozzle flap, location/purpose/function		GF83.10-P-2172GI
Actuator motor, rear shut-off flap, location/purpose/function		GF83.10-P-2171GI
Actuator motor, rear air distribution flap, location/purpose/function		GF83.10-P-2173GI
Heating system heat exchanger, location/purpose/function		GF83.20-P-2108GC
Heating water circulation pump, location/purpose/function		GF83.20-P-2109GI
Fresh air/recirculation flap, location/purpose/function		GF83.20-P-2111GC
Fresh air/recirculation flap actuator, location/purpose/function		GF83.30-P-2116GC
Blower switch, location/purpose/design/function		GF83.25-P-2100GI
Blower button, location/purpose/function	Rear ventilation operating module	GF83.40-P-2144GI
Air distribution switch, location/purpose/design/ function		GF83.25-P-2101GI
Air distribution button, location/purpose/function	Rear ventilation operating module	GF83.40-P-2159GI
Temperature selector wheel, location/purpose/design/function		GF83.25-P-2102GI
Defroster button, location/purpose/function		GF83.40-P-2139GI
Recirculating air push-button, location/purpose/ function		GF83.40-P-2145GI
		GF83.40-P-

Auto button, location/purpose/function	Rear ventilation operating module	**2147GI** **GF83.40-P-2147GJ**
AC OFF button, location/purpose/function		**GF83.40-P-2107GI**
Residual heat button, location/purpose/function		**GF83.40-P-2148GI**
Rear compartment air distribution button, location/purpose/function		**GF83.40-P-2173GI**
All-activity module, location/purpose/function		**GF54.21-P-4110GH**
Air conditioner housing, location/purpose/design/function		**GF83.40-P-2105GI**
Auxiliary fan, location/purpose/function	Engine 111.977, 112.942, 112.970 with code 580 up to 31.08.01 Engine 112.942, 112.970 with code 580a as of 01.09.01	**GF83.40-P-2162GH**
Engine and AC electric suction fan with integrated control, location/purpose/function	Engine 113.942 with code 580a up to 31.08.01 Engine 113.981, 113.965, 612.963, 628.963, with code 580a as of 01.09.01	**GF83.40-P-2172GI**
Condenser, location/purpose/function		**GF83.40-P-2152GC**
Evaporator location/purpose/design/function		**GF83.40-P-2121GC**
Fluid reservoir, location/purpose/function		**GF83.40-P-2153GI**
Expansion valve, location/purpose/design/function		**GF83.40-P-2123GC**
Refrigerant pressure and temperature sensor, location/purpose/function		**GF83.40-P-2171GI**
Refrigerant compressor, location/purpose/design/function		**GF83.55-P-2100P**
Control valve, location/purpose/function		**GF83.55-P-2102P**
Belt pulley, location/purpose/design/function		**GF83.55-P-2103P**
Pressure relief valve, location/purpose/function		**GF83.55-P-2104P**
In-car temperature sensor location/purpose/function		**GF83.57-P-2115GI**
Ice-up protection temperature sensor, location/ purpose/function		**GF83.57-P-2113GH**
Blending air flap actuator, location/purpose/		**GF83.57-P-**

function		**2112GI**
Ambient air temperature sensor, location/ purpose/function		**GF83.57-P-2119GI**
Outlet air temperature sensor, center nozzle, location/purpose/function		**GF83.57-P-2116GI**
Outlet air temperature sensor, front footwell, location/purpose/function		**GF83.57-P-2117GI**
Outlet air temperature sensor rear, location/ purpose/function		**GF83.57-P-2118GI**
Sun sensor, location/purpose/function		**GF83.57-P-2111GI**
Electric heater booster, location/purpose/ design/function	Engine 612.963	GF83.70-P-4054GH
Extended activity module, location/purpose/ design		**GF54.21-P-4107GK**
CDI control module, location/purpose/function		GF07.16-P-3102IA
Table of contents, automatic air conditioning (AAC) function description		**GF83.40-P-0999GI**

REFRIGERANT COMPRESSOR, LOCATION - GF83.55-P-2100-01GH

Illustrated up to 31.08.01

The refrigerant compressor (A9) is flanged to the engine at front left

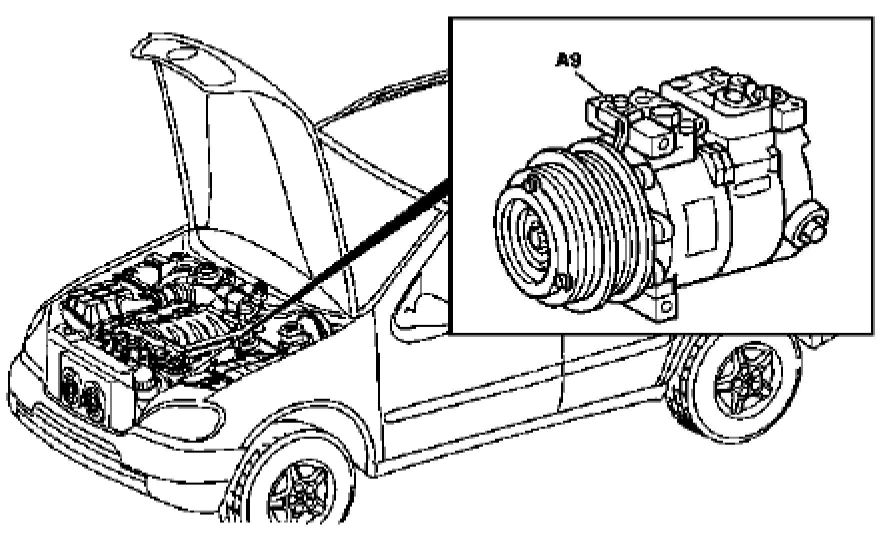


Fig. 98: Identifying Refrigerant Compressor

REFRIGERANT COMPRESSOR, FUNCTION - GF83.55-P-2100-02A

Refrigerant compressor 7SB16C

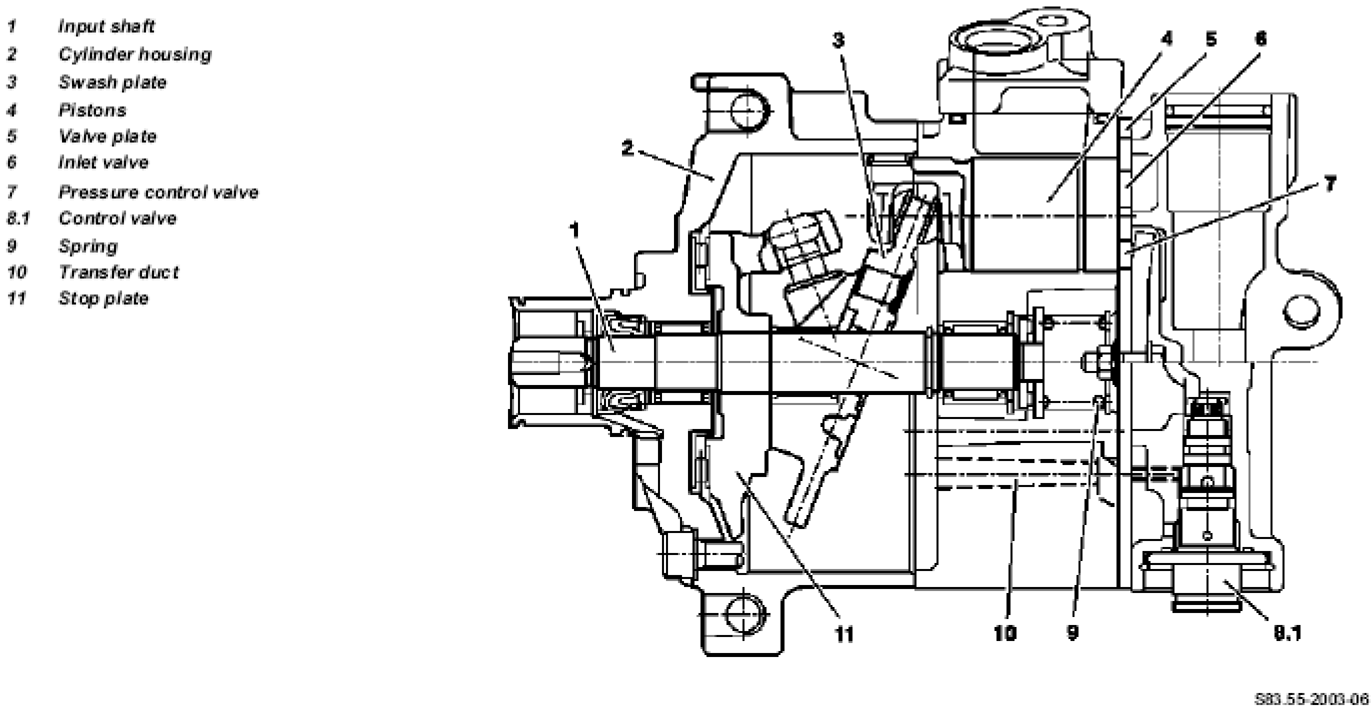


Fig. 99: Identifying Refrigerant Compressor 7SB16C Components

Function

After the electromagnetic clutch (A9k1) has produced the frictional connection between the automotive engine and the refrigerant compressor, the drive shaft (1) drives the swash plate (3). The rotation of the inclined swash plate (3) causes the pistons (4) to move in strokes. During the intake stroke, refrigerant vapor is sucked in via the inlet valve (6).

If the piston (4) moves in the counter direction, it delivers the refrigerant vapor via the pressure control valve (7), with the vapor being compressed and heating up, into the refrigerant line to the capacitor. With refrigerant compressor, model 7SB16C, the refrigerant vapor acts on the control valve (8.1) in the refrigerant compressor for volume control.

Volume control in model 7SB16C

With a low engine speed, the efficiency of an air conditioning system is severely reduced by the low number of working strokes of the refrigerant compressor and the reduced cooling of the refrigerant in the capacitor. In this situation there is an increase in the thermal load. The refrigerant compressor is therefore designed so that it has a sufficient delivery rate even at low rotational speeds.

With an increase in the engine speed and the vehicle speed, the thermal load drops and the delivery rate of the refrigerant compressor increases. To prevent the refrigerant compressor now from consuming unnecessary engine power and nevertheless to maintain the refrigeration cycle, the refrigerant compressor reduces its power

from a maximum of 100 % to a minimum of 5 %.

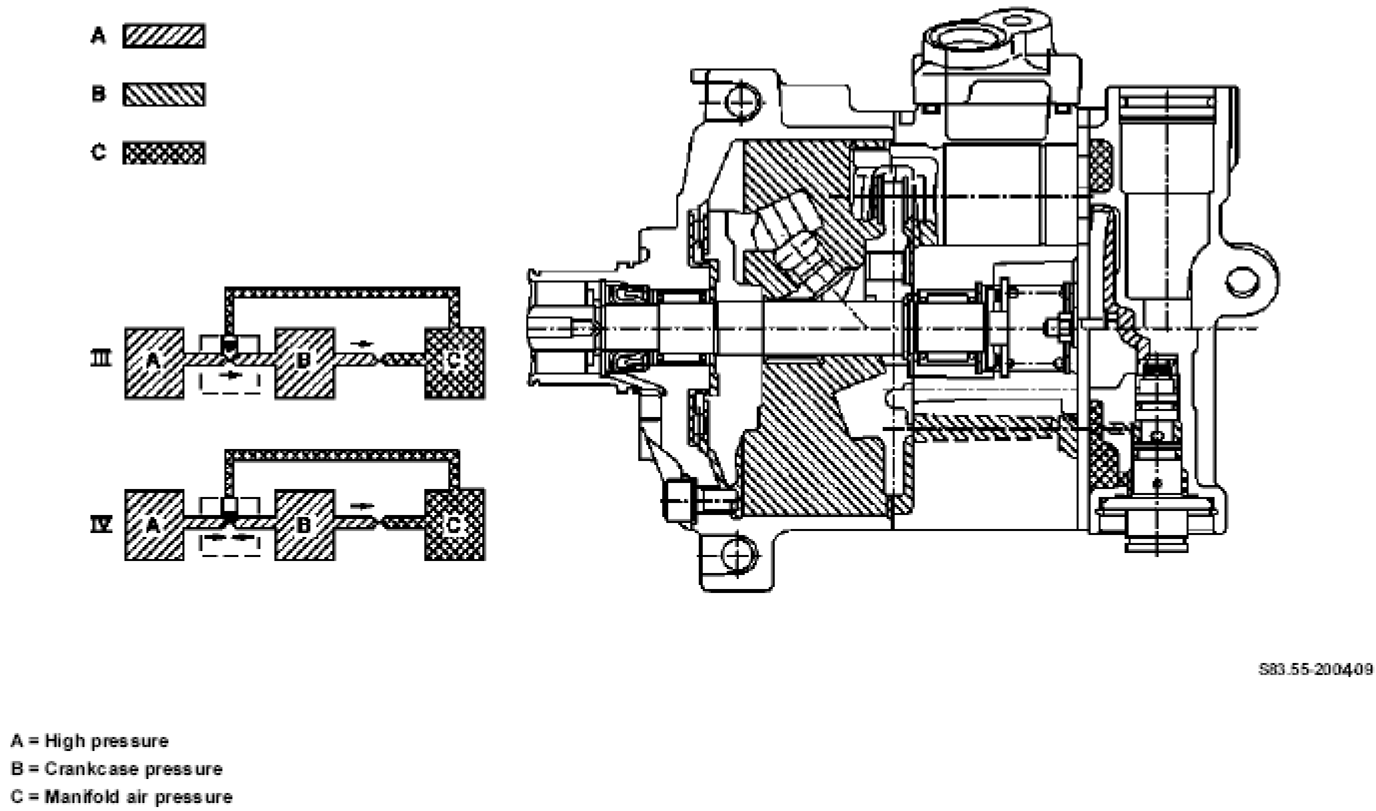


Fig. 100: Identifying Refrigerant Compressor, Function - (1 Of 2)

Function

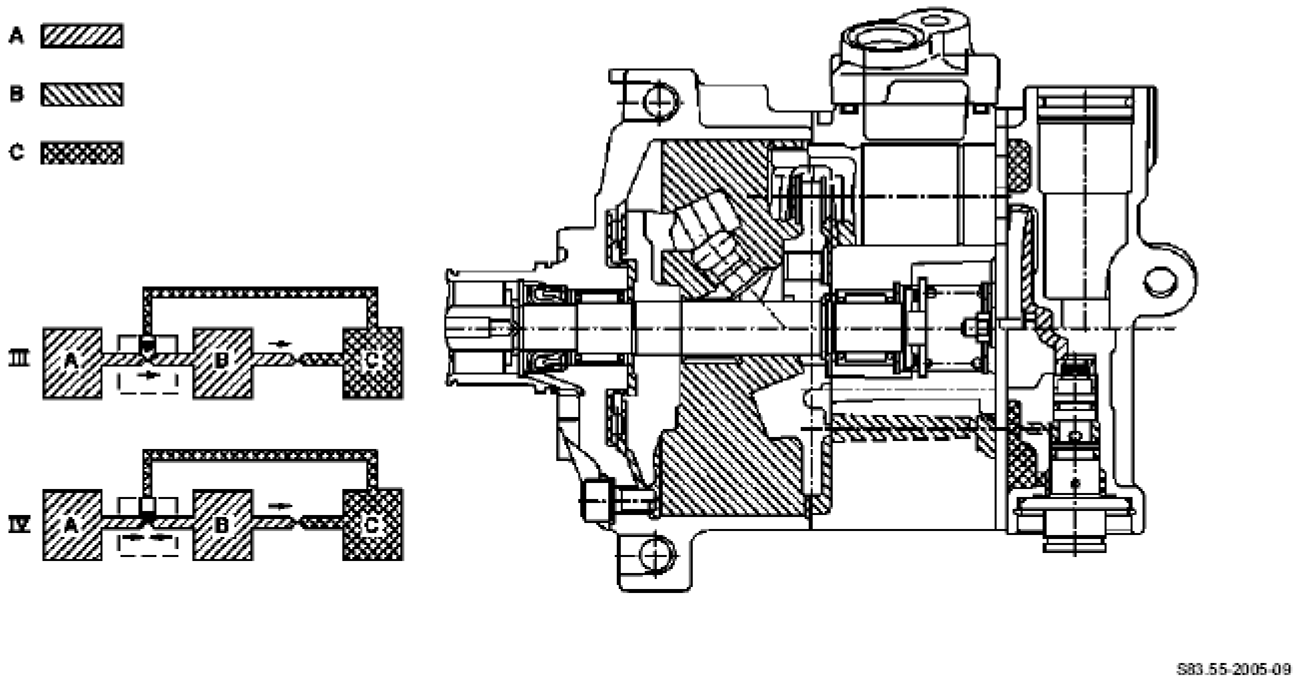
100% power (I)

The conditions for full power are either a constantly low rotational speed or a high thermal load or both. The high manifold air pressure **C** causes the control valve to close. This prevents steam from flowing between the rear opening and the crankcase. There is always some flow through the transfer duct between the crankcase and the inlet opening. Therefore, in the crankcase there is almost the same pressure **B** as on the inlet side **C** . As a result, the swash plate is moved into the position for maximum volume. The angle between the swash plate and the vertical is at its greatest. This results in a large stroke.

Power from 100% to 5% output (II)

If the influencing conditions change in that the thermal load drops or the engine speed increases, the pressure on the inlet side **C** drops and allows the control valve to open.

Then compressed refrigerant now flows from the rear opening to the crankcase. The pressure in the crankcase **B** increases therefore and causes the swash plate to reduce its angle, which leads to a reduction in power.



A = High pressure
B = Crankcase pressure
C = Manifold air pressure

Fig. 101: Identifying Refrigerant Compressor, Function - (2 Of 2)

Function

5% power (III)

If the engine speed is high or the thermal load is low, this results in a constantly low manifold air pressure **C** which keeps the control valve open.

There is a flow from the high-pressure side **A** to the crankcase. The pressure in the crankcase **B** reaches a peak. Consequently, the swash plate is forced into a position in which only a minimum power is possible. The angle between the vertical and the swash plate is at its smallest. This results in a small stroke.

Power from 5% to 100% output (IV)

If the conditions change again in that the thermal load increases or the engine speed drops, the manifold air pressure **C** increases. There is now no longer any flow between the rear opening and the crankcase.

Due to the uniform flow from the crankcase to the inlet opening through the transfer duct, the high pressure **A** reaches almost the same level as the manifold air pressure **C** . Consequently, the swash plate angle increases and therefore the power increases until it reaches a maximum.

REFRIGERANT COMPRESSOR, FUNCTION - GF83.55-P-2100-02P

1 Belt pulley
2 Crankcase
3 Alignment pin
4 Swash plate
5 Damping container on the pressure side
6 Pistons
7 Damping container on the suction side
8 Refrigerant compressor control valve
9 Valve plate
10 Coil body
11 Sliding shoe
12 Stop plate
13 Refrigerant compressor shaft

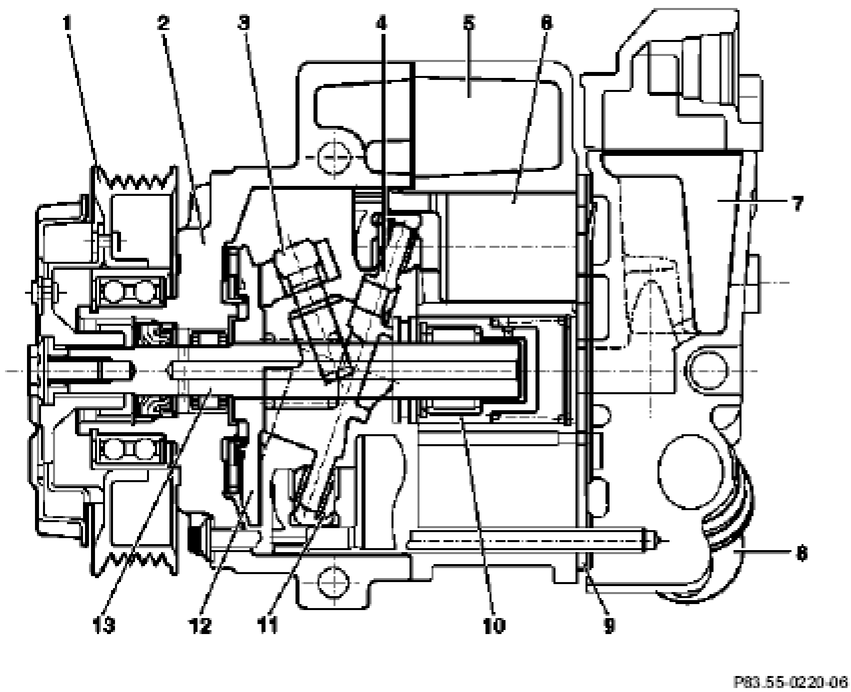


Fig. 102: Identifying Refrigerant Compressor Components

Function

The rotary movement of the belt pulley (1) is transmitted via the refrigerant compressor shaft (13) to the stop plate (12), which is permanently fastened to the refrigerant compressor shaft (13) by way of a press fit.

The rotation of the stop plate (12) is transmitted to the swash plate (4) by means of a hinged mechanism.

Conversion of the swash plate's (4) rotary motion into the oscillating motion of the seven pistons (6) takes place via two sliding shoes each (11).

The evaporation tank on the pressure side (5) and evaporation tank on the suction side (7) reduce gas pulsation in the refrigerant compressor by providing for uniform refrigerant flow. This helps to prevent noise in the compression process

Volume control

The refrigerant compressor control valve (8) has a corresponding control current applied to it to match the output requested. This in turn enables the compression volume to be regulated between 2 and 100 %.

The position of the swash plate (4) is determined through monitoring, processing and evaluation of the following automatic air conditioning controlled variables:

- Pressure in the crankcase (2) of the refrigerant compressor

- Diaphragm pressure in the refrigerant compressor control valve (8) (approx. 2 bar)
- Suction pressure of refrigerant compressor

The change in suction pressure which is dependent on the control current on the refrigerant compressor control valve (8) induces a change of pressure in the crankcase (2) and thus a corresponding adjustment of the swash plate (4).

Automatic air conditioning (AAC [KLA]) OFF

If the automatic air conditioning is regulated or manually switched off, the refrigerant compressor control valve (8) is completely opened. Refrigerant flows unobstructed over the high pressure side into the crankcase (2). This in turn leads to a rapid pressure rise in the crankcase (2). The coil body (10), for closing the refrigerant compressor, is displaced here to the right against the valve plate (9) and thus stops the flow of refrigerant over the intake side.

Refrigerant compressor lubrication when automatic air conditioning switched off

An internal lubrication circuit ensures the lubrication supply for all moving parts.

Lubrication is ensured at a minimum refrigerant compressor volumetric flow by means of two valves being regulated. In doing so, the refrigerant is transported together with the compressor oil located in the crankcase (2) over the bored refrigerant compressor shaft (13). The mixture enters the cylinder housing, where it is compressed and then pumped into the refrigerant circuit.

REFRIGERANT COMPRESSOR, DESIGN - GF83.55-P-2100-03P

1	Belt pulley
2	Crankcase
3	Alignment pin
4	Swash plate
5	Damping container on the pressure side
6	Pistons
7	Damping container on the suction side
8	Refrigerant compressor control valve
9	Valve plate
10	Coil body
11	Sliding shoe
12	Stop plate
13	Refrigerant compressor shaft

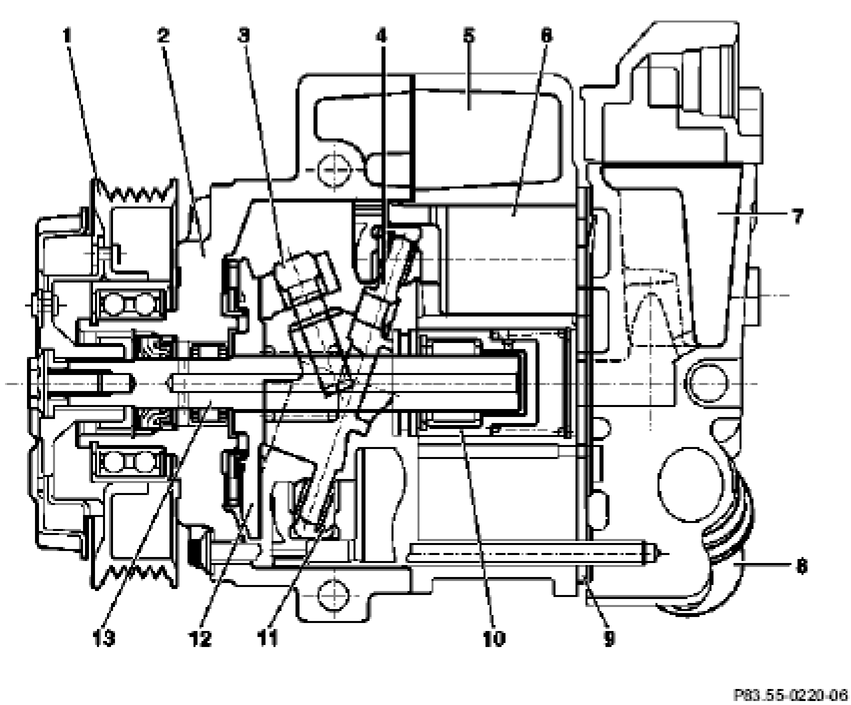


Fig. 103: Identifying Refrigerant Compressor Components

REFRIGERANT COMPRESSOR, LOCATION/TASK/DESIGN/FUNCTION - GF83.55-P-2100GH

ENGINES 111.977, 112.942, 113.942/981, 612.963 in MODEL 163 up to 31.08.01 with CODE (580) Air conditioning or Tempmatic for USA refrigerant compressor 7SB16C

Design

Refrigerant compressor 7SB16C

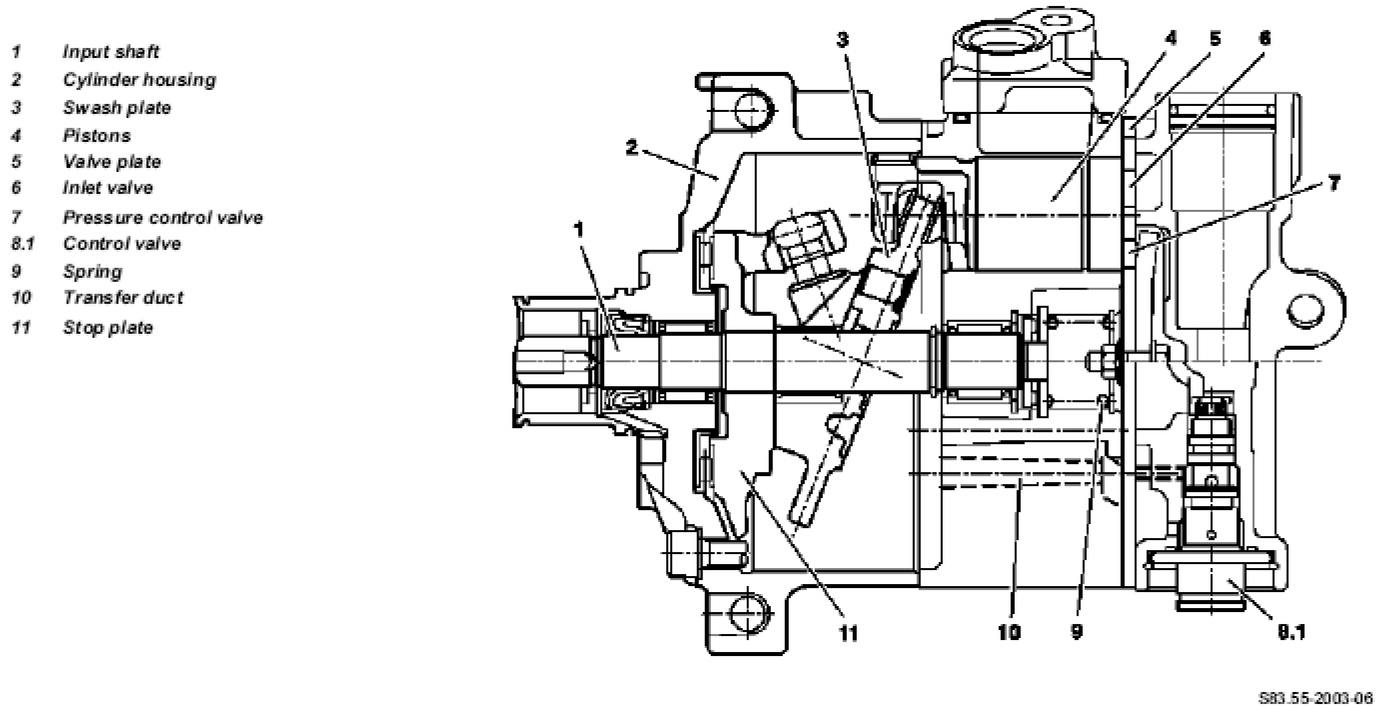


Fig. 104: Identifying Refrigerant Compressor 7SB16C Components

Refrigerant compressor, position		GF83.55-P-2100-01GH
Refrigerant compressor, task	The refrigerant compressor (A9) is responsible for induction and compression of the refrigerant.	
Refrigerant compressor, function		GF83.55-P-2100-02A

REFRIGERANT COMPRESSOR, LOCATION/TASK/DESIGN/FUNCTION - GF83.55-P-2100P

ENGINE 111, 112, 113, 271, 272, 611, 612, 642, 646 in MODEL 203.0 /2 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 111, 112, 271, 272, 611, 612, 646 in MODEL 203.7 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 112.942 /970, 113.942 /965 /981, 612.963, 628.963 in MODEL 163 as of 1.9.01 with CODE (580) Automatic air conditioning

ENGINE 112, 113, 271, 272, 273, 612, 642, 646 in MODEL 209.3

ENGINE 112, 113, 271, 272, 273, 642 in MODEL 209.4

Shown on model 203

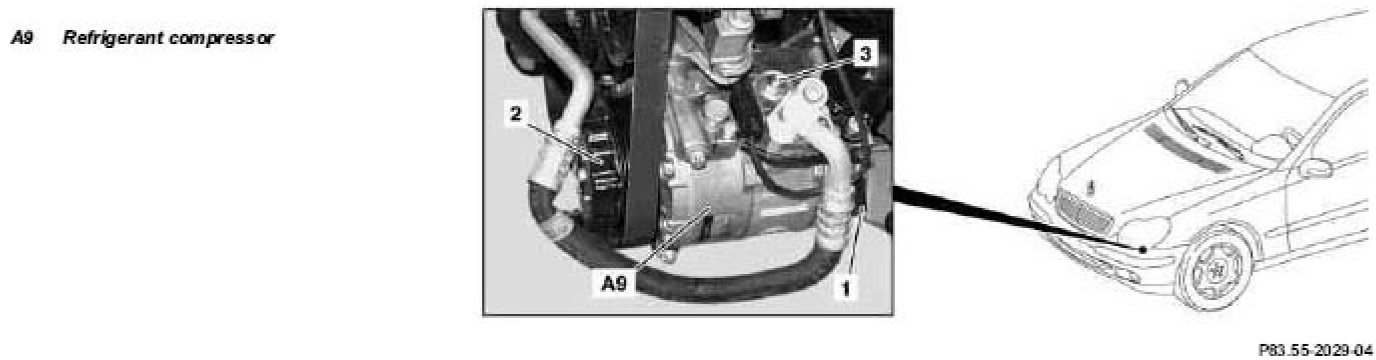


Fig. 105: Identifying Refrigerant Compressor - Shown On Model 203

	Refrigerant compressor, position	The refrigerant compressor (A9) is flange-mounted to the left front of the engine. Model 163	**GF83.55-P-2100-01GH**
	Refrigerant compressor, task	The refrigerant compressor (A9) is responsible for induction and compression of the refrigerant.	
	Refrigerant compressor, design		**GF83.55-P-2100-03P**
	Refrigerant compressor, function		**GF83.55-P-2100-02P**

ELECTROMAGNETIC CLUTCH, FUNCTION - GF83.55-P-2101-01A

Electromagnetic clutch (A9k1)

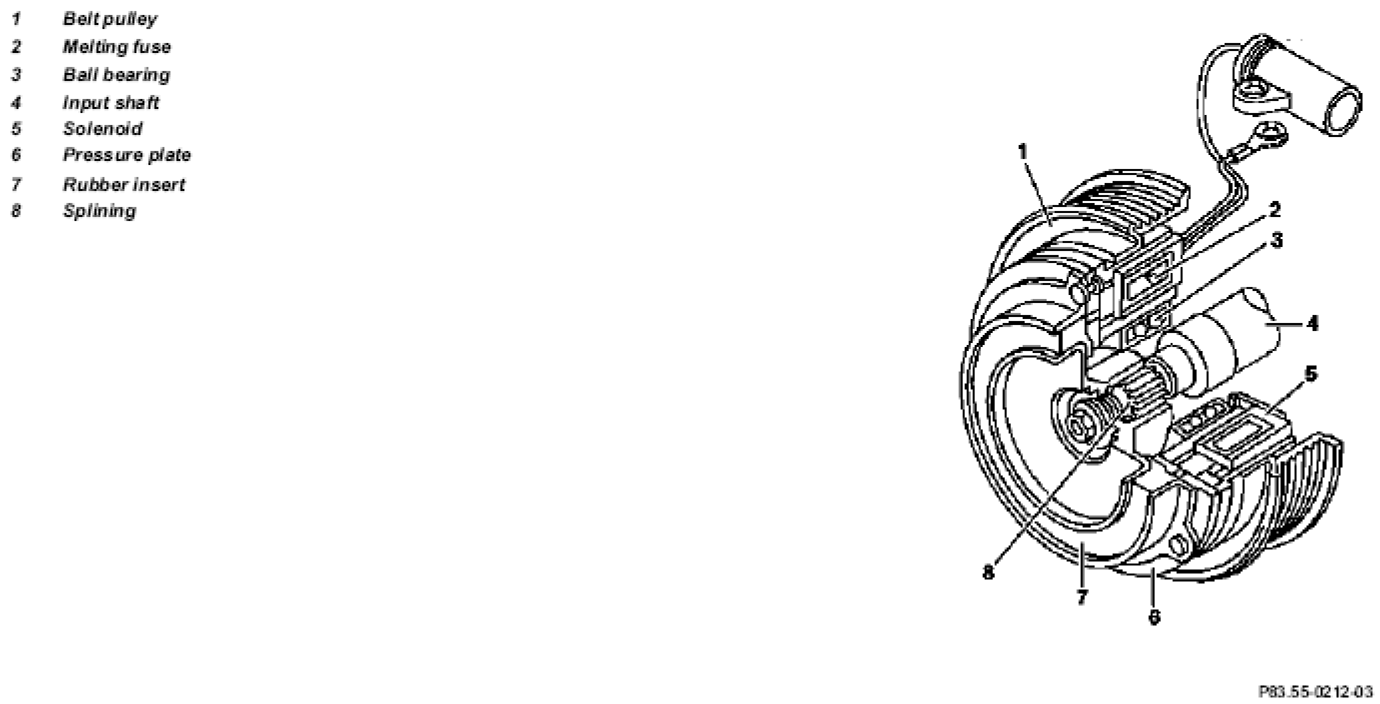


Fig. 106: Identifying Electromagnetic Clutch (A9K1) Components

Function

In order to start operating the refrigerant compressor, the push-button control module (N19, N22) actuates the electromagnetic clutch (A9k1) and the solenoid (5) is supplied with electrical current. The magnetic force attracts the pressure plate (6) against the rubber insert (7) and holds it securely. This creates the frictional connection between the automotive engine and the refrigerant compressor. If the solenoid (5) is de-energized, then the pressure plate (6) is pressed back by the rubber insert (7) into its rest position and the frictional connection is interrupted.

Safety shutoff of the refrigerant compressor

To prevent a mechanical defect in the refrigerant compressor from causing the poly V-belt to jump loose, the electromagnetic clutch releases itself automatically. With a mechanical defect, the refrigerant compressor rotates more sluggishly or even locks completely. The heat generated at the friction surface causes the melting fuse (2) in the solenoid (5) to melt. The current supply to the solenoid (5) is interrupted and the frictional connection is released.

ELECTROMAGNETIC CLUTCH, LOCATION - GF83.55-P-2101-02GH

The electromagnetic clutch (A9k1) is located on the drive shaft of the refrigerant compressor (A9) at the front left in the engine compartment.

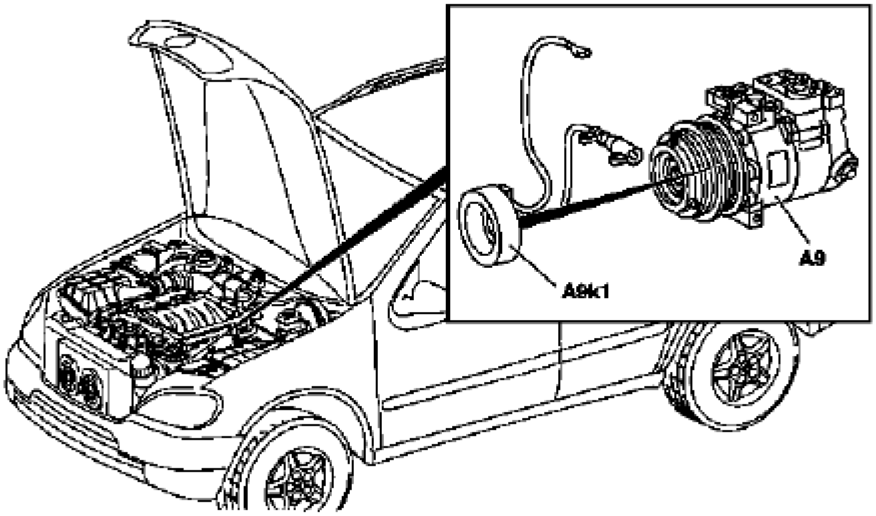


Fig. 107: Identifying Electromagnetic Clutch

ELECTROMAGNETIC CLUTCH, DESIGN - GF83.55-P-2101-03GH

The belt pulley (1) mounted on the drive shaft (4) of the refrigerant compressor is driven by the poly V-belt. It rotates on the ball bearing (3), around the solenoid (5) attached on the refrigerant compressor housing. The pressure plate (6) with the rubber insert (7) is connected via splining (8) to the drive shaft (4) of the refrigerant compressor and is axially displaceable thereon.

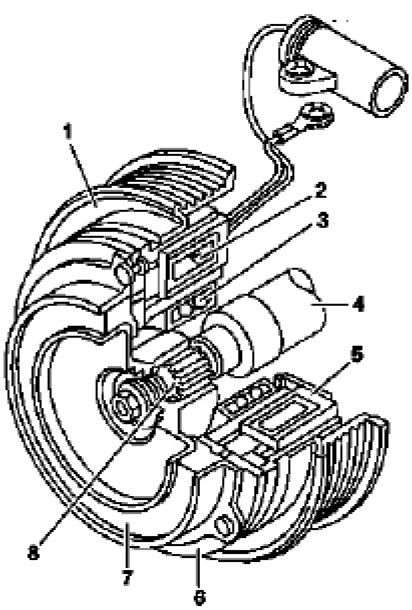


Fig. 108: Identifying Electromagnetic Clutch (A9K1) Components

ELECTROMAGNETIC CLUTCH POSITION/TASK/DESIGN/FUNCTION - GF83.55-P-2101GH

ENGINES 111.977, 112.942, 113.942/981, 612.963 in MODEL 163 up to 31.08.01 with CODE (580) Air conditioning or Tempmatic for USA

Electromagnetic clutch (A9k1)

1 Belt pulley
2 Melting fuse
3 Ball bearing
4 Input shaft
5 Solenoid
6 Pressure plate
7 Rubber insert
8 Splining

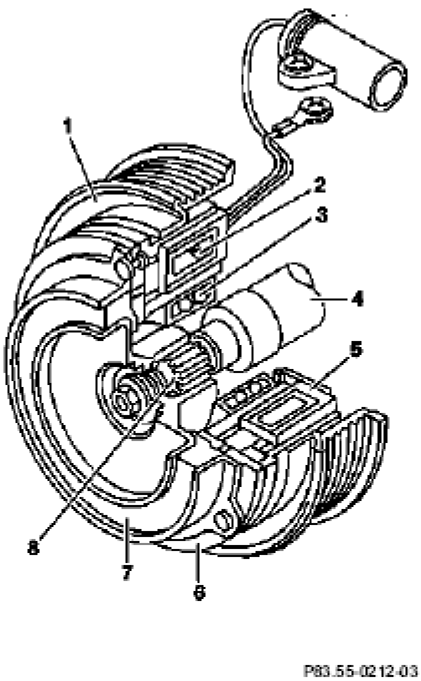


Fig. 109: Identifying Electromagnetic Clutch (A9K1) Components

Electromagnetic clutch, location		**GF83.55-P-2101-02GH**
Electromagnetic clutch, task	• Switching the frictional connection between the automotive engine and the refrigerant compressor • Switching off the refrigerant compressor with a mechanical defect.	
Electromagnetic clutch, design		**GF83.55-P-2101-03GH**
Electromagnetic clutch, function		**GF83.55-P-2101-01A**

REFRIGERANT COMPRESSOR CONTROL VALVE, FUNCTION - GF83.55-P-2102-02P

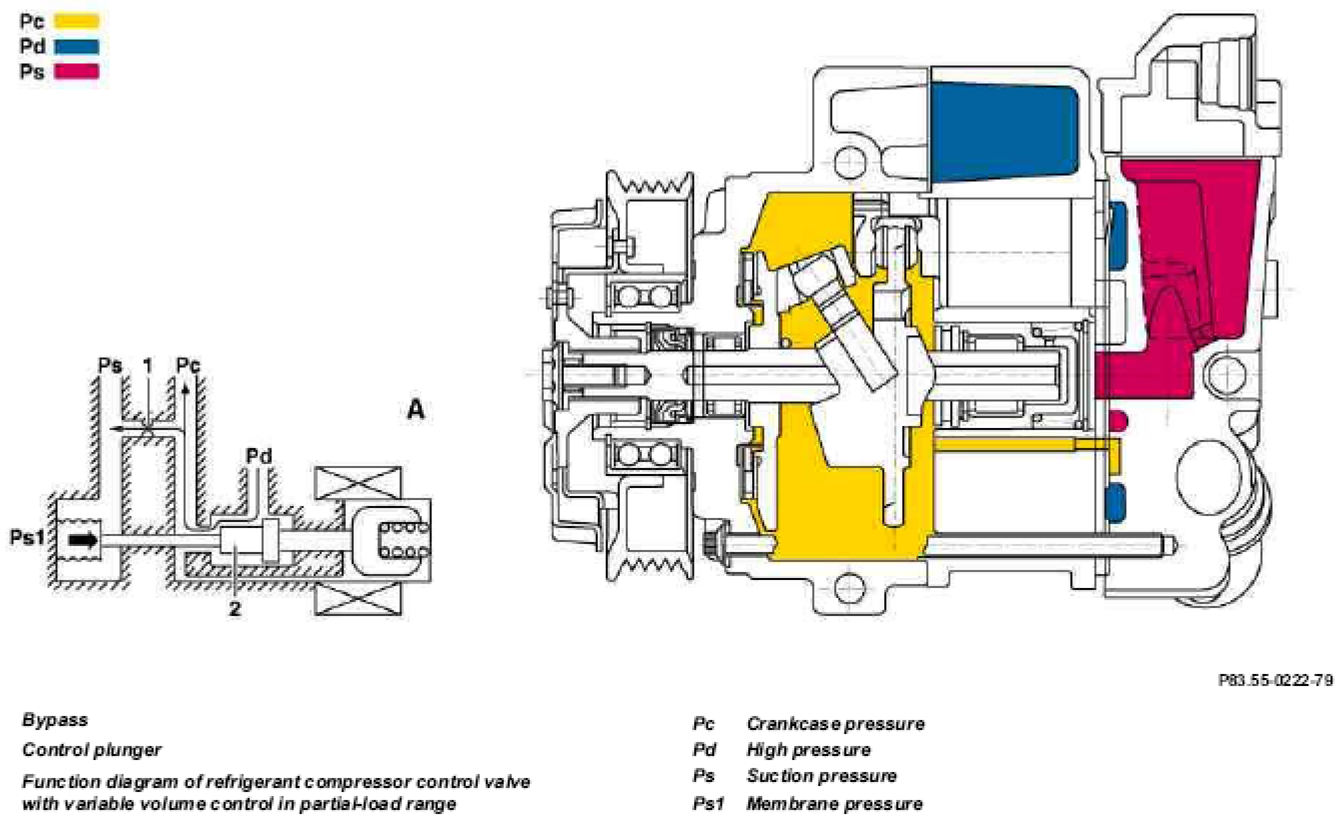


Fig. 110: Identifying Refrigerant Compressor Control Valve, Function (1 Of 2)

Variable volume control in partial load range

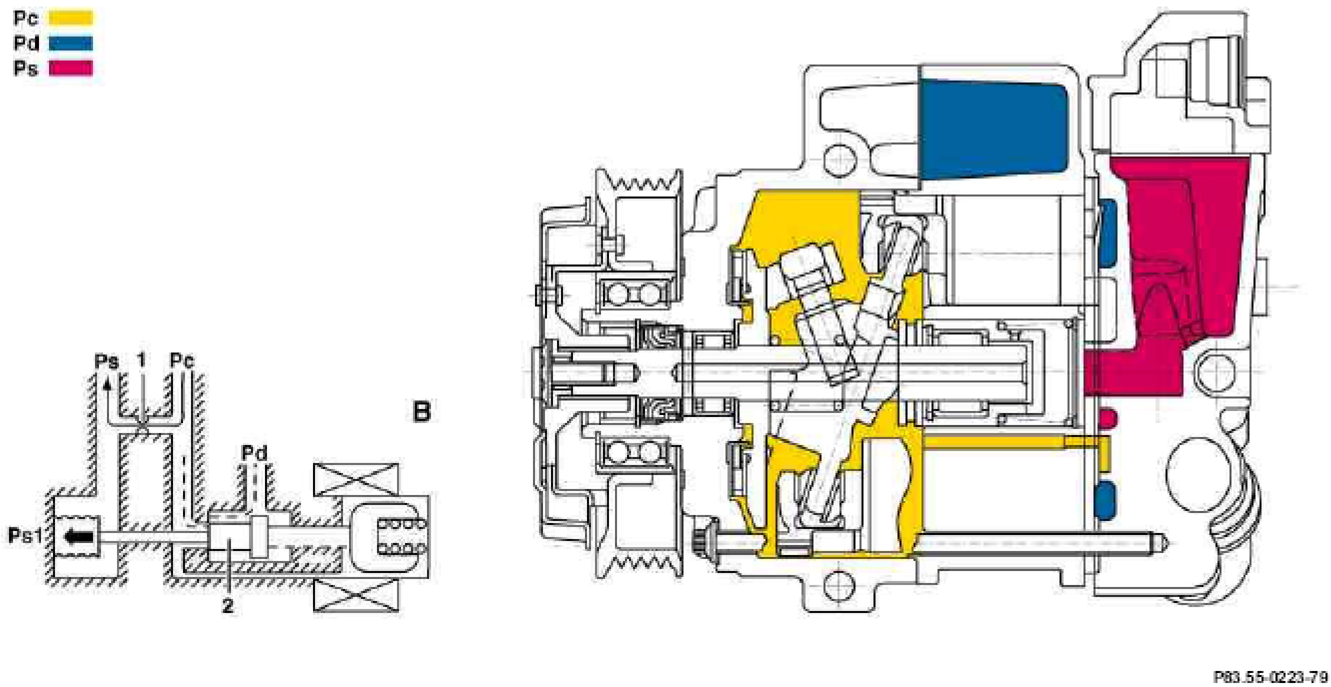
(e.g. at low ambient temperature or low cooling capacity requirement)

Essentially, the cooling output is dependent on the intake pressure, i.e. if the suction pressure (Ps) drops below the diaphragm pressure (Ps1) in the refrigerant compressor control valve and the regulating current is reduced at the same time, then the passage from high pressure (Pd) to crankcase pressure (Pc) is released by the control plunger (2) in the refrigerant compressor control valve. As a result, refrigerant flows from the high pressure side into the crankcase which results in an increase in crankcase pressure (Pc).

The sum of the forces on the left-hand side, resulting from the crankcase pressure (Pc), the return force (centrifugal force) of the swash plate and the spring return force thus becomes greater than total piston forces. The swash plate moves into a vertical position, which causes a reduction in piston travel and replacement volume.

In addition, a regulation of the cooling output takes place as a function of the air humidity, i.e. at high air humidity there is an external actuation of the control valve, achieving a post-regulation of the cooling output (preventing fogging up of the windows).

The refrigerant compressor is automatically switched off at a volumetric flow of less than 5 cm^3 .



1	Bypass	Pc	Crankcase pressure
2	Control plunger	Pd	High pressure
B	Function diagram of refrigerant compressor control valve at max. swept volume	Ps	Suction pressure
		Ps1	Membrane pressure

Fig. 111: Identifying Refrigerant Compressor Control Valve, Function (2 Of 2)

Control at max. swept volume

(e.g. at higher ambient temperature or higher cooling capacity requirement)

If the suction pressure (Ps) rises above the diaphragm pressure (Ps1) in the refrigerant compressor control valve and the control current is increased at the same time, in the refrigerant compressor control valve the passage - high pressure (Pd) to crankcase pressure (Pc) - is closed by the control plunger (2). The crankcase pressure (Pc) drops, as no refrigerant flows from the high pressure side into the crankcase via the refrigerant compressor control valve.

In the long-term the bypass (1) sets up a pressure compensation between the suction pressure (Ps) and crankcase pressure (Pc), i.e. the sum of the reaction forces on the left side, resulting from the crankcase pressure (Pc), return force of the swash plate (centrifugal force) and the spring return force, is therefore smaller than the sum of the piston forces. The swash plate angle extends to beyond the "0-position ", i.e. the inclined position increases continuously to the swash plate's mechanical limit stop at the stop plate. The piston stroke increases linear to the swash plate's inclination till it reaches max. volumetric flow.

CONTROL VALVE, LOCATION/TASK/FUNCTION - GF83.55-P-2102P

ENGINE 111, 112, 113, 271, 272, 611, 612, 642, 646 in MODEL 203.0 /2 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 111, 112, 271, 272, 611, 612, 646 in MODEL 203.7 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 112.942 /970, 113.942 /965 /981, 612.963, 628.963 in MODEL 163 as of 1.9.01 with CODE (580) Automatic air conditioning

ENGINE 112, 113, 271, 272, 273, 612, 642, 646 in MODEL 209.3

ENGINE 112, 113, 271, 272, 273, 642 in MODEL 209.4

Shown on model 203

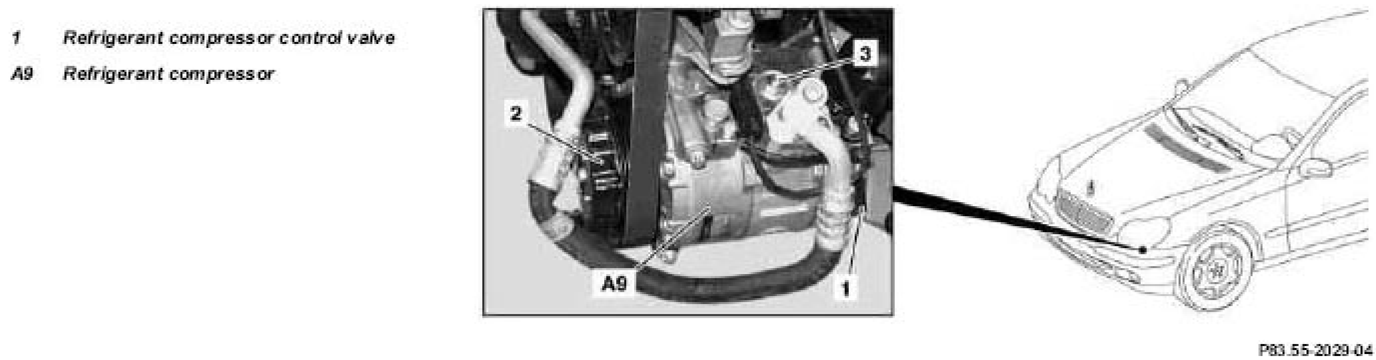


Fig. 112: Identifying Refrigerant Compressor Control Valve And Compressor - Shown On Model 203

	Refrigerant compressor control valve, position	The refrigerant compressor control valve (1) is located on the refrigerant compressor (A9).	
	Refrigerant compressor control valve, task	The refrigerant compressor control valve (1) regulates the swept volume of the refrigerant compressor (A9) dependent upon the refrigerant capacity requirement.	
	Refrigerant compressor control valve, function		**GF83.55-P-2102-02P**

BELT PULLEY, FUNCTION - GF83.55-P-2103-02P

Function under normal operating conditions

Under normal operating conditions the rubber (2) is deformation resistant. Thus it transmits the belt pulley's (3) torque to the hub (1) and at the same time to the refrigerant compressor shaft, whereby the hub (1) and belt pulley (3) turn in the direction of the arrow.

The refrigerant compressor torque < the rubber torque limit (2). In this operating condition, the rubber (2) acts as a shock absorber by inhibiting resonance via the belt with other engine components.

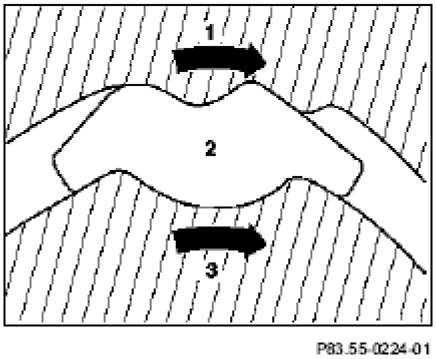


Fig. 113: Identifying Belt Pulley, Function - Function Under Normal Operating Conditions

Function of refrigerant compressor lock up

When the refrigerant compressor locks up, the torque required to drive the refrigerant compressor must be greater than the torque present on the belt pulley (3). This causes slip to occur between the belt pulley (3) and hub (1) because of the deformation and wear of the rubber (2). Thus the belt pulley (3) continues to rotate even with a locked up refrigerant compressor.

The refrigerant compressor torque > the rubber torque limit (2).

In this operating condition, the rubber (2) acts as a belt pulley protection device.

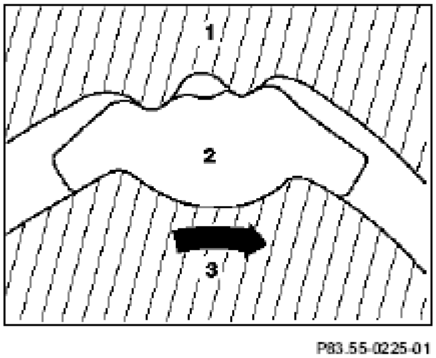


Fig. 114: Identifying Belt Pulley, Function - Function Of Refrigerant Compressor Lock Up

BELT PULLEY, DESIGN - GF83.55-P-2103-03P

The belt pulley (3) is attached to the hub (1) via the rubbers (2), the hub (1) being firmly connected to the refrigerant compressor shaft.

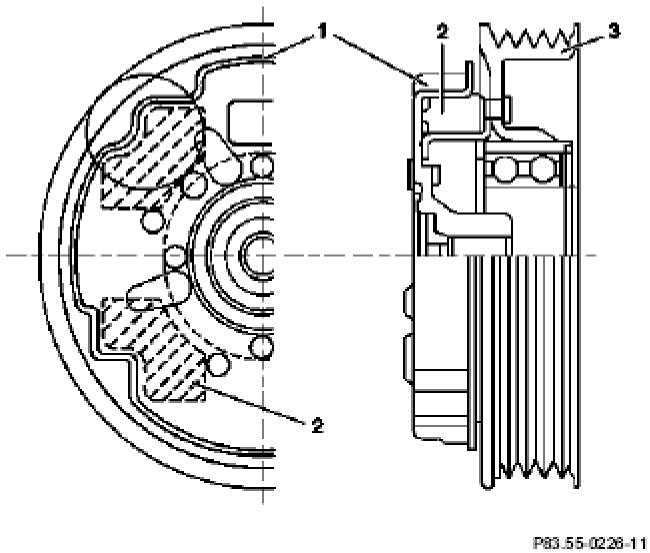


Fig. 115: Identifying Belt Pulley, Design

BELT PULLEY, LOCATION/TASK/DESIGN/FUNCTION - GF83.55-P-2103P

ENGINE 111, 112, 113, 271, 272, 611, 612, 642, 646 in MODEL 203.0 /2 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 111, 112, 271, 272, 611, 612, 646 in MODEL 203.7 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 112.942 /970, 113.942 /965 /981, 612.963, 628.963 in MODEL 163 as of 1.9.01 with CODE (580) Automatic air conditioning

ENGINE 112, 113, 271, 272, 273, 612, 642, 646 in MODEL 209.3

ENGINE 112, 113, 271, 272, 273, 642 in MODEL 209.4

Shown on model 203

2 Belt pulley

A9 Refrigerant compressor

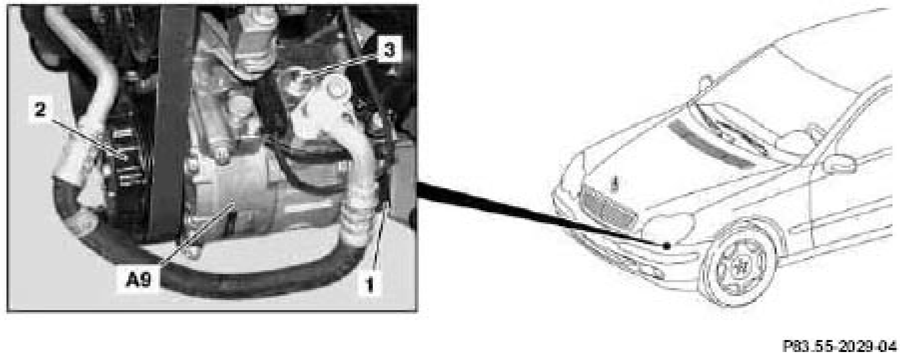


Fig. 116: Identifying Belt Pulley And Refrigerant Compressor - Shown On Model 203

Belt pulley, position	The belt pulley (2) is located on the front of the drive shaft on the refrigerant compressor (A9).	
Belt pulley, task	The belt pulley (2) drives the refrigerant compressor (A9). In addition the pulley (2) is also used as a torque damper and a torque limiter.	
Belt pulley, design		**GF83.55-P-2103-03P**
Belt pulley, function		**GF83.55-P-2103-02P**

PRESSURE RELIEF VALVE, FUNCTION - GF83.55-P-2104-02P

The pressure relief valve is a pressure sensitive wax valve. It is used when all other pressure-dependent safety devices cannot prevent a pressure rise in the refrigerant compressor (A9).

The wax can withstand a pressure of approx. 35 bar. If the pressure increases to above this value, the wax fuse is destroyed and pressure is released through the created opening.

PRESSURE RELIEF VALVE, LOCATION / TASK / FUNCTION - GF83.55-P-2104P

ENGINE 111, 112, 113, 271, 272, 611, 612, 642, 646 in MODEL 203.0 /2 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 111, 112, 271, 272, 611, 612, 646 in MODEL 203.7 with CODE (580) Air conditioning (or Tempmatic for USA) with CODE (580) Automatic air conditioning with CODE (581) Automatic air conditioning with CODE (581) Comfort automatic air conditioning

ENGINE 112.942 /970, 113.942 /965 /981, 612.963, 628.963 in MODEL 163 as of 1.9.01 with CODE (580) Automatic air conditioning

ENGINE 112, 113, 271, 272, 273, 612, 642, 646 in MODEL 209.3

ENGINE 112, 113, 271, 272, 273, 642 in MODEL 209.4

Shown on model 203

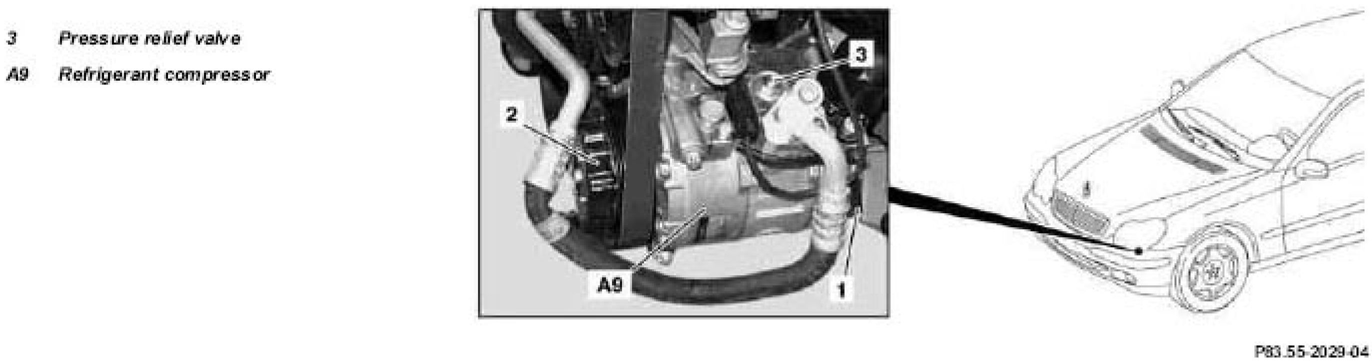


Fig. 117: Identifying Pressure Relief Valve And Refrigerant Compressor - Shown On Model 203

Pressure relief valve, position	The pressure relief valve (3) is located on the refrigerant compressor (A9).	
Pressure relief valve, task	The pressure relief valve (3) serves to protect the refrigerant circuit from damage caused by excess pressure.	
Pressure relief valve, function		**GF83.55-P-2104-02P**

TEMPERATURE CONTROL, FUNCTION - GF83.57-P-2000GH

MODEL 163 up to 31.08.01 with CODE (580) Air conditioning or Tempmatic for USA

Function

The temperature preselected at the temperature selector wheels is reached or kept constant by:

- heating up by the heat exchanger,
- heating up by the electric heater booster (with engine 612.963 only)
- cooling by the evaporator core,
- cooling and reheating (reheat mode).

Heating up

The heating system heat exchanger heats the air passing by, which is then conducted into the vehicle interior by the air ducts.

Heating up by the electric heater booster

Due to the high level of efficiency of the direct-injection diesel engine, the heat output of the coolant is not sufficient to heat the fresh air. By installing the electric heater booster, behind the heating system heat exchanger, this heating capacity deficit is compensated.

Cooling down

The thermostatic expansion valve located on the evaporator core serves to expand the liquid refrigerant which is under high pressure thus lowering its pressure. After this the refrigerant evaporates. The evaporation heat required for this is taken from the air flowing through the evaporator. The resulting cooled down air then succeeds in entering the passenger compartment via the air ducts.

Reheat mode

The air which has been cooled down and dehumidified by the evaporator core is heated up again by the heat exchanger (reheat). This serves to prevent the windows from misting up on the inside.

Temperature selector wheel, location/task/ design/function		**GF83.25-P-2102GC**
Heating system heat exchanger, location/ purpose/function		**GF83.20-P-2108GC**
Evaporator, location/purpose/design/function		**GF83.40-P-2121GC**
Expansion valve, location/task/design/function		**GF83.40-P-2123GC**
Refrigerant compressor, location/task/design/ function		**GF83.55-P-2100GH**
In-car temperature sensor, location/task/function	with suction jet nozzle up to 30.11.99	**GF83.57-P-2115GH**
In-car temperature sensor with ventilation fan, location/task/function	as of 01.12.99	**GF83.57-P-2107GH**
Defroster protection temperature sensor, location/task/function		**GF83.57-P-2113GH**
Blending air flap actuator, location / task / function		**GF83.57-P-2112GC**
Outside temperature sensor, location/task/ function	as of 01.12.99	**GF83.57-P-2110GH**
Air conditioning control module, location/task/ function		**GF83.30-P-2102GH**
All Activity Module, location/task/function		**GF54.21-P-4110GH**
Electric heater booster position/task/design/ function	Engine 612.963	GF83.70-P-4054GH
Temperature regulator microswitch, location/ task/function	Engine 612.963	GF83.70-P-4055GH
Extended activity module, position/task		**GF54.21-P-4106GH**
Extended Activity Module, location/task/design	as of 1.12.99	**GF54.21-P-4107GK**

	CDI control module, location/task/function	Engine 612.963	GF07.16-P-3102IA

TEMPERATURE CONTROL, FUNCTION - GF83.57-P-2000GI

MODEL 163 as of 01.09.01 with CODE (580a) Automatic air conditioning

Function

The electronically controlled cooling, heating and ventilation system of the automatic air conditioning achieves the desired in-car temperature as rapidly as possible or maintains it constantly.

The following options are available for this purpose:

- the evaporator cooling the air
- the heating system heat exchanger heating the air

Temperature control

The temperature values needed for the temperature control are determined by the in-car temperature sensors (N22b1), center nozzle air stream (B10/24), footwell at front (B10/25), rear (B10/7), outside temperature indicator (B14) and defroster protection (R35).

The electronics of the AAC push-button control module (N22) compare the various test values with the temperature preselected at the temperature selector wheel.

As required, the automatic air conditioning performs the regulation in that in heating mode it controls the position of the blending air flaps, via the blending air flap actuator motor (M2/6), or in cooling mode it actuates the refrigerant compressor and thus keeps the respective setting constant.

	Temperature selector wheel, location/task/ design/function		**GF83.25-P-2102GI**
	Heating system heat exchanger, location/ purpose/function		**GF83.20-P-2108GC**
	Evaporator, location/purpose/design/function		**GF83.40-P-2121GC**
	Expansion valve, location/task/design/function		**GF83.40-P-2123GC**
	Refrigerant compressor, location/task/design/ function		**GF83.55-P-2100P**
	Control valve, location/task/function		**GF83.55-P-2102P**
	In-car temperature sensor, location/task/function		**GF83.57-P-2115GI**
	Center nozzle air stream temperature sensor, location/task/function		**GF83.57-P-2116GI**
	Front footwell air stream temperature sensor,		**GF83.57-P-**

	location/task/function		**2117GI**
	Rear air stream temperature sensor, location/ task/function		**GF83.57-P-2118GI**
	Defroster protection temperature sensor, location/task/function		**GF83.57-P-2113GH**
	Blending air flap actuator, location / task / function		**GF83.57-P-2112GI**
	Outside temperature indicator temperature sensor, location/task/function		**GF83.57-P-2119GI**
	Sun sensor position/task/function		**GF83.57-P-2111GI**
	Electric heater booster position/task/design/ function	Engine 612.963	GF83.70-P-4054GH

IN-CAR TEMPERATURE SENSOR WITH ASPIRATOR BLOWER, LOCATION - GF83.57-P-2100-01GH

The in-car temperature sensor (B10/4) is located on the center console on the left next to the radio. The aspirator blower (M9) associated with the in-car temperature sensor is located at the bottom left on the evaporator housing.

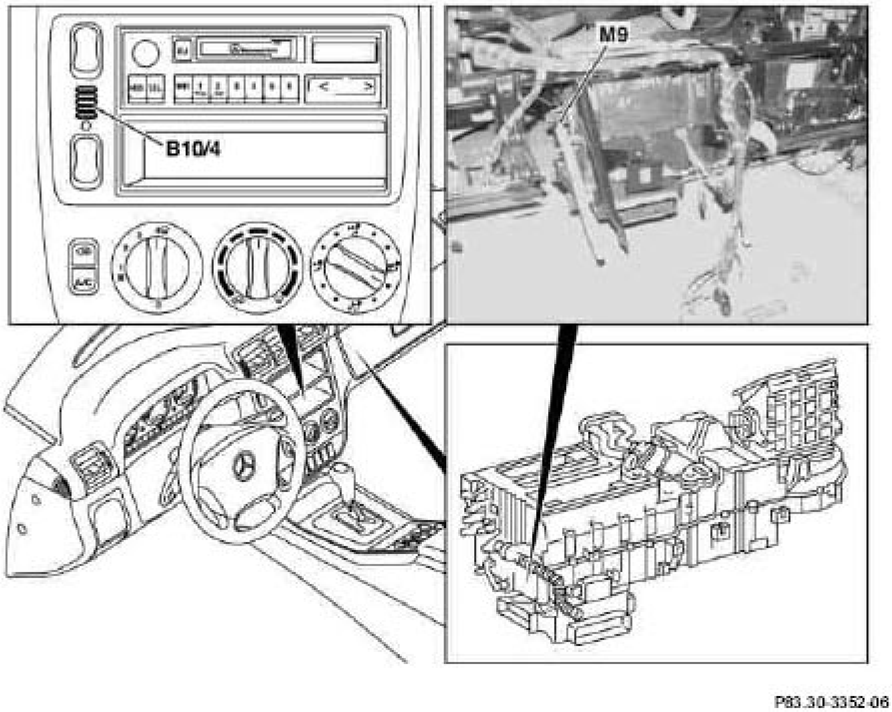


Fig. 118: Identifying In-Car Temperature Sensor

IN-CAR TEMPERATURE SENSOR WITH ASPIRATOR BLOWER FUNCTION - GF83.57-P-2100-02GH

Function

The in-car temperature sensor (B10/4) is equipped with an aspirator blower which constantly draws air out of the vehicle interior for the temperature measurement when the ignition is **ON** . The in-car temperature sensor (B10/4) records the interior temperature and conveys it to the AAC push-button control module. A comparison is made there with the setting on the temperature selector and the blend air flap is repositioned depending on the result of this comparison.

It is connected to the AAC push-button control module via a separate electric cable.

Constant circulation of the interior air at the in-car temperature sensor (B10/4) is achieved by the in-car temperature sensor aspirator blower (M9) and therefore ensures a high level of control accuracy.

In contrast to the previous suction jet nozzle a high level of control accuracy is ensured by the in-car temperature sensor aspirator blower (M9).

OUTSIDE AIR TEMPERATURE SENSOR FUNCTION - GF83.57-P-2103-01GH

Function

The resistance of the outside air temperature sensor (B10/5) depends on the ambient temperature and the ground speed. With an increase in the outside temperature, its resistance decreases. This information is sent to the air conditioning control module (N19). This information causes a slight lowering or raising of the temperature selected at the air conditioning control panel.

This achieves an adaptation to the temperature perception of the occupants.

The outside temperature depends on the ground speed, which prevents a value for the outside temperature that is too high - as may occur when the vehicle is stationary or when traveling slowly, e.g. due to thermal radiation from the engine - from being sent to the air conditioning control module (N19).

The value of the ground speed is sent from the traction systems control module (N47) via the instrument cluster (A1) to the air conditioning control module (N19).

When switching the ignition off and on and with speeds lower than 20 km/h the temperature measured last is used.

OUTSIDE AIR TEMPERATURE SENSOR POSITION - GF83.57-P-2103-02GH

The outside air temperature sensor (B10/5) is located at the front on the air inlet of the evaporator housing.

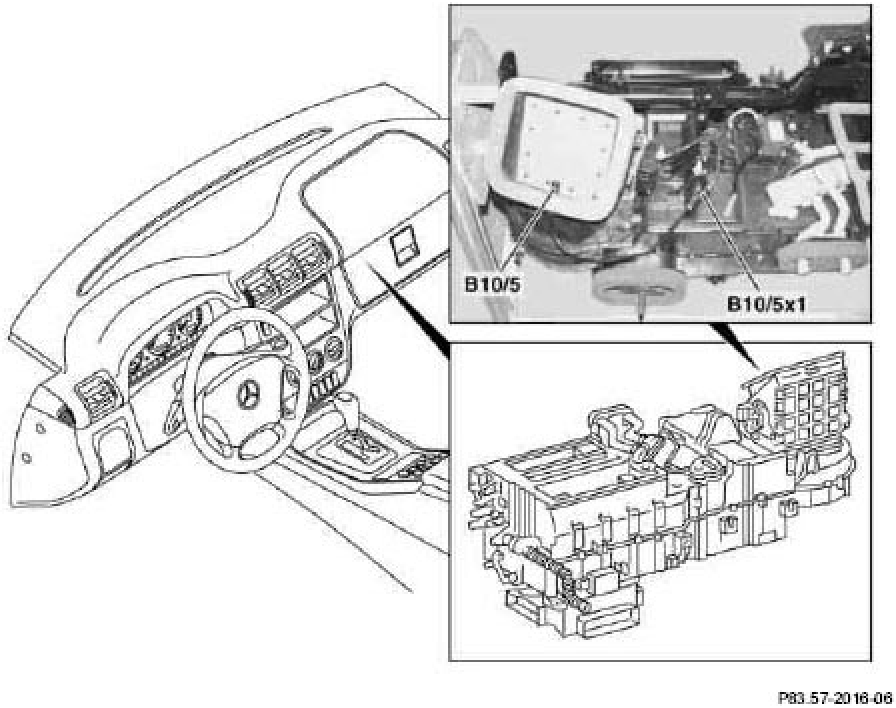


Fig. 119: Identifying Outside Air Temperature Sensor

BLENDING AIR ACTUATOR, LOCATION - GF83.57-P-2105-01GH

The blending air flap actuator motor (M16/8) is located at the top in the center on the evaporator housing.

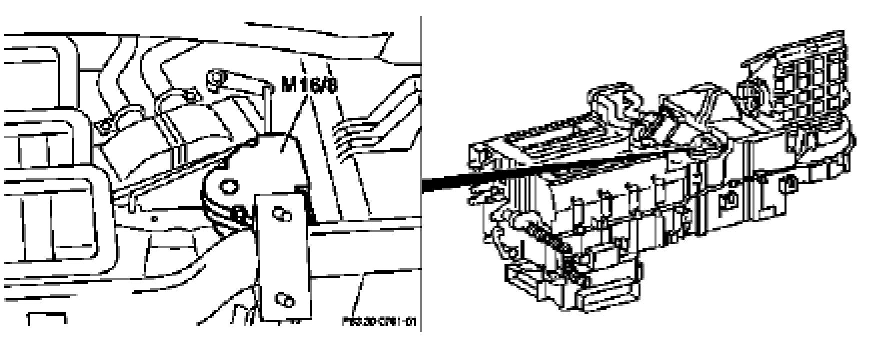


Fig. 120: Identifying Blending Air Flap Actuator Motor

BLENDING AIR FLAP MOTOR FUNCTION - GF83.57-P-2105-02GH

Function

The blending air flap actuator motor (M16/8) is actuated via the air conditioning control module depending on the position of the temperature selector wheel in the air conditioning control panel and the actual in-car temperature.

The mechanical flaps are regulated by a linkage to the blending air flap actuator motor (M16/8). The flaps open or close the passage of air through the heating system heat exchanger in order to mix heated air with cooled air in the correct proportion necessary to achieve the desired in-car temperature.

The set point flap angle of the blending air flaps is determined by the air conditioning control module as a function of the following information:

- set point temperature selected at the temperature selector wheel
- in-car temperature measured at the in-car temperature sensor (B10/4)

BLENDING AIR FLAP MOTOR FUNCTION - GF83.57-P-2105-02GI

Function

The blending air flap actuator motor (M2/6) is actuated via the AC bus and as a function of the position of the temperature selector wheel in the AAC push-button control module (N22) and the actual in-car temperature.

The mechanical flaps are regulated by a linkage to the blending air flap actuator motor (M2/6). The flaps open or close the passage of air through the heating system heat exchanger in order to mix heated air with cooled air in the correct proportion necessary to achieve the desired in-car temperature.

The set point flap angle of the blending air flaps is determined by the AAC push-button control module (N22) as a function of the following information:

- set point temperature selected at the temperature selector wheel
- in-car temperature measured at the in-car temperature sensor (N22b1)
- temperatures of the air stream measured at the center nozzle air stream temperature sensors, footwell forward and rear (B10/24, B10/25 and B10/7)
- outside temperature measured by the outside temperature indicator temperature sensor (B14)

All actuators are identical.

If a problem exists, it is possible to retrieve and verify the defined end positions by means of the diagnosis assistant system (DAS) (valuation trip).

After an actuator motor has been replaced, an adjustment run must be performed via the Diagnosis Assistant System (DAS), i.e. the end positions flap OPEN and SHUT are defined and retained.

ICING PROTECTION TEMPERATURE SENSOR, LOCATION - GF83.57-P-2106-01GH

The icing protection temperature sensor (R35) is located at the center rear of the evaporator housing.

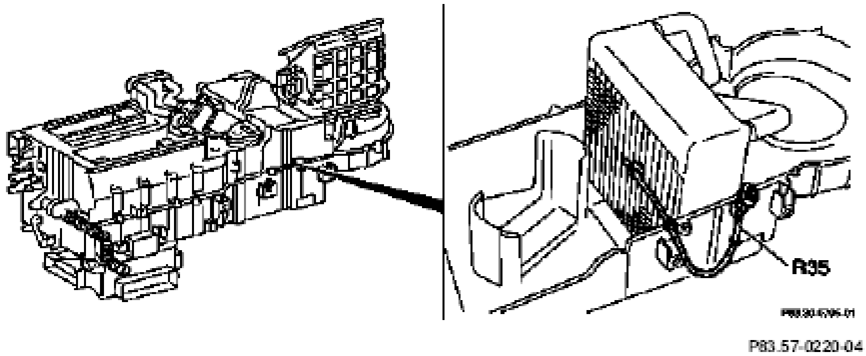


Fig. 121: Identifying Icing Protection Temperature Sensor

ICING PROTECTION TEMPERATURE SENSOR, FUNCTION - GF83.57-P-2106-02GH

Function

The icing protection temperature sensor (R35) is located in the air flow behind the evaporator. It sends its resistance value depending upon the temperature at the evaporator to the air conditioning control panel (S98) or AAC push-button control module (N22).

At an evaporator temperature of 1 to 3°C the refrigerant compressor is switched off. This helps to prevent the evaporator from icing up. As a result the outlet temperature fluctuates insignificantly at the nozzles.

IN-CAR TEMPERATURE SENSOR WITH ASPIRATOR BLOWER, LOCATION/TASK/FUNCTION - GF83.57-P-2107GH

MODEL 163 as of 1.12.99 up to 31.8.01

	In-car temperature sensor with aspirator blower, location		**GF83.57-P-2100-01GH**
	In-car temperature sensor with aspirator blower, task	The in-car temperature sensor (B10/4) with aspirator blower (M9) records all the in-car temperatures and sends them to the air conditioning control module. The aspirator blower (M9) then uses air from the passenger compartment to supply a constant flow of air to the in-car temperature sensor (B10/4).	
	In-car temperature sensor with aspirator blower function		**GF83.57-P-2100-02GH**

OUTSIDE TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2110GH

MODEL 163 as of 1.12.99 up to 31.8.01 with code (580) Air conditioning or Tempmatic for USA

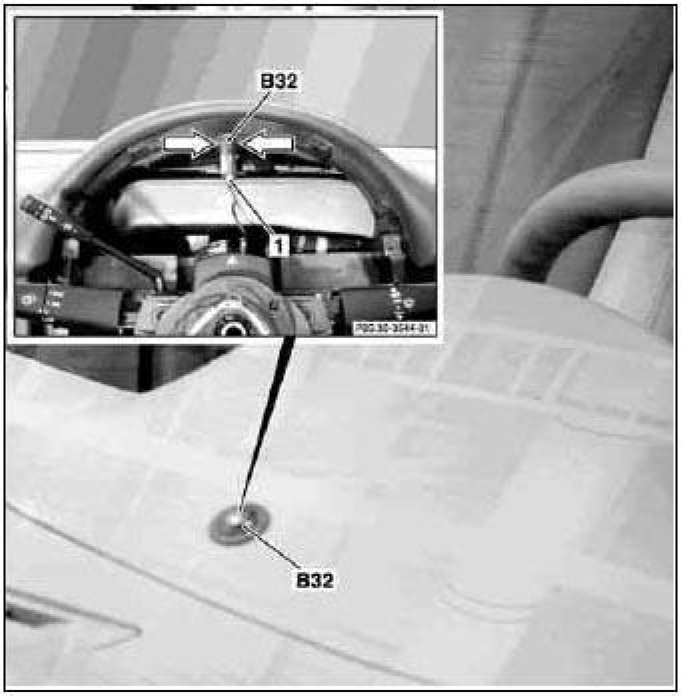
	Outside temperature sensor position		**GF83.57-P-2103-02GH**

Outside temperature sensor, task	The outside temperature sensor (B10/5) records all the outside temperature and sends it to the air conditioning control module (N19).	
Outside temperature sensor function		**GF83.57-P-2103-01GH**

SUN SENSOR POSITION/TASK/FUNCTION - GF83.57-P-2111GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

B32 Sun sensor



P83.30-3543-12

Fig. 122: Identifying Sun Sensor

Sun sensor, location	The sun sensor (B32) is located behind the instrument cluster in the instrument panel.
Sun sensor, task	The sun sensor (B32) measures the intensity and direction of the solar radiation.
Sun sensor, function	The sun sensor (B32) records the intensity and angle of incidence of the solar radiation onto the vehicle. This makes it possible, dependent on the solar radiation intensity (brightness) the in-car temperature and the blower speed to be automatically adjusted.

BLENDING AIR FLAP ACTUATOR MOTOR, LOCATION/TASK/FUNCTION - GF83.57-P-2112GC

MODEL 163 up to 31.8.01, 168 with code (580) Air conditioning or Tempmatic for USA

Blending air flap		GF83.57-P-

	actuator motor, location	Model 168	2105-01GC
		Model 163	**GF83.57-P-2105-01GH**
	Blending air flap actuator motor, task	The blending air flap actuator motor (M16/8) serves to set the air conditioning system's ventilation temperature.	
	Blending air flap actuator motor, function	Model 168	GF83.57-P-2105-02GC
		Model 163	**GF83.57-P-2105-02GH**

BLENDING AIR FLAP ACTUATOR MOTOR, LOCATION/TASK/FUNCTION - GF83.57-P-2112GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

M2/6 *Blending air flap actuator motor*

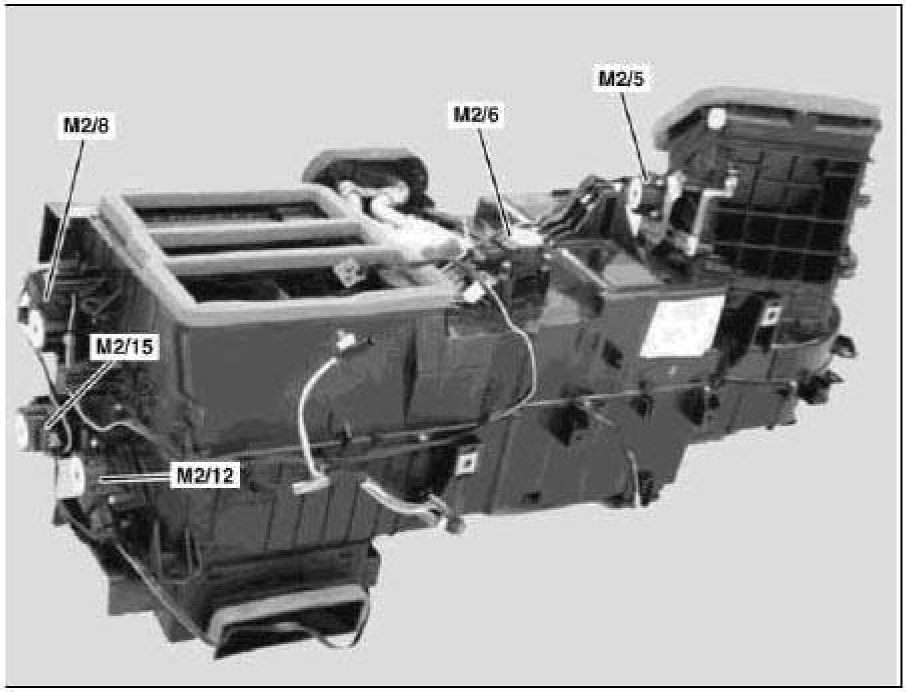


Fig. 123: Identifying Blending Air Flap Actuator Motor

	Blending air flap actuator motor, location	The blending air flap actuator motor (M2/6) is located at the top center of automatic air conditioner housing.	
	Blending air flap actuator motor, task	The blending air flap actuator motor (M2/6) serves to set the air conditioning system's ventilation temperature.	
	Blending air flap actuator motor, function		**GF83.57-P-2105-02GI**

ICING PROTECTION TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2113GH

MODEL 163 up to 31.8.01 with CODE (580) Air conditioning or Tempmatic for USA

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

Icing protection temperature sensor, location		**GF83.57-P-2106-01GH**
Icing protection temperature sensor, task	The icing protection temperature sensor (R35) records the evaporator temperature, whereupon the refrigerant compressor is switched off and the evaporator protected against icing up.	
Icing protection temperature sensor, function		**GF83.57-P-2106-02GH**

IN-CAR TEMPERATURE SENSOR, LOCATION - GF83.57-P-2115-01GH

The in-car temperature sensor (B10/4) with suction jet nozzle is located on the left of the center console next to the radio.

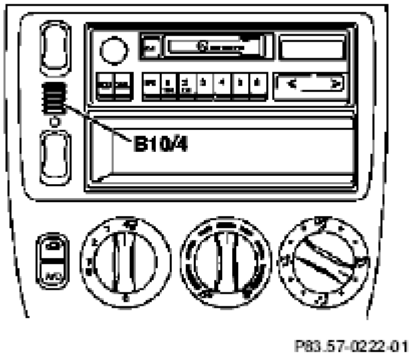


Fig. 124: Identifying In-Car Temperature Sensor

IN-CAR TEMPERATURE SENSOR, FUNCTION - GF83.57-P-2115-02GH

Function

When the blower is running, air is constantly drawn out of the vehicle interior by a suction jet nozzle for the in-car temperature sensor (B10/4) to measure the temperature when the ignition is. **ON** .

The in-car temperature sensor (B10/4) records the interior temperature and conveys it to the AAC push-button control module, where a comparison is made with the setting on the temperature selector. The blend air flap is repositioned depending on the result of this.

It is connected to the AAC push-button control module via a separate electric cable.

Constant circulation of interior air at the in-car temperature sensor (B10/4) is achieved by this ventilation and therefore a high level of control accuracy is guaranteed.

IN-CAR TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2115GH

MODEL 163 up to 30.11.99 with CODE (580) Air conditioning or Tempmatic for USA with suction jet nozzle

In-car temperature sensor, location		**GF83.57-P-2115-01GH**
In-car temperature sensor, task	The in-car temperature sensor (B10/4) with suction jet nozzle records the interior temperature and conveys this to the AAC push-button control module. The suction jet nozzle ensures air from the vehicle interior flows evenly around the in-car temperature sensor (B10/4).	
In-car temperature sensor, function		**GF83.57-P-2115-02GH**

IN-CAR TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2115GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

N22b1 Interior air temperature sensor

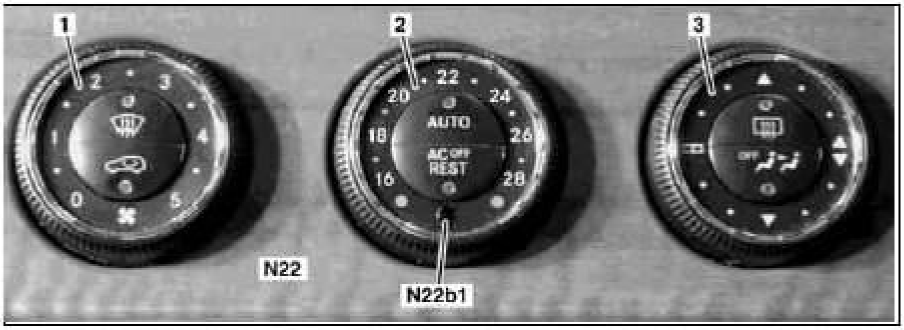


Fig. 125: Identifying Interior Air Temperature Sensor

In-car temperature sensor, location	The in-car temperature sensor (N22b1) is located below in the temperature selector wheel of the AAC push-button control module.
In-car temperature sensor, task	The in-car temperature sensor (N22b1) records the in-car temperature and sends it to the AAC push-button control module (N22).
In-car temperature sensor, function	The recorded in-car temperature value is compared by the AAC push-button control module with the setting in the temperature selector wheel whereupon it authorizes a corresponding adjustment to the blending air flap to be made depending upon the result.

CENTER NOZZLE VENT AIR TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2116GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

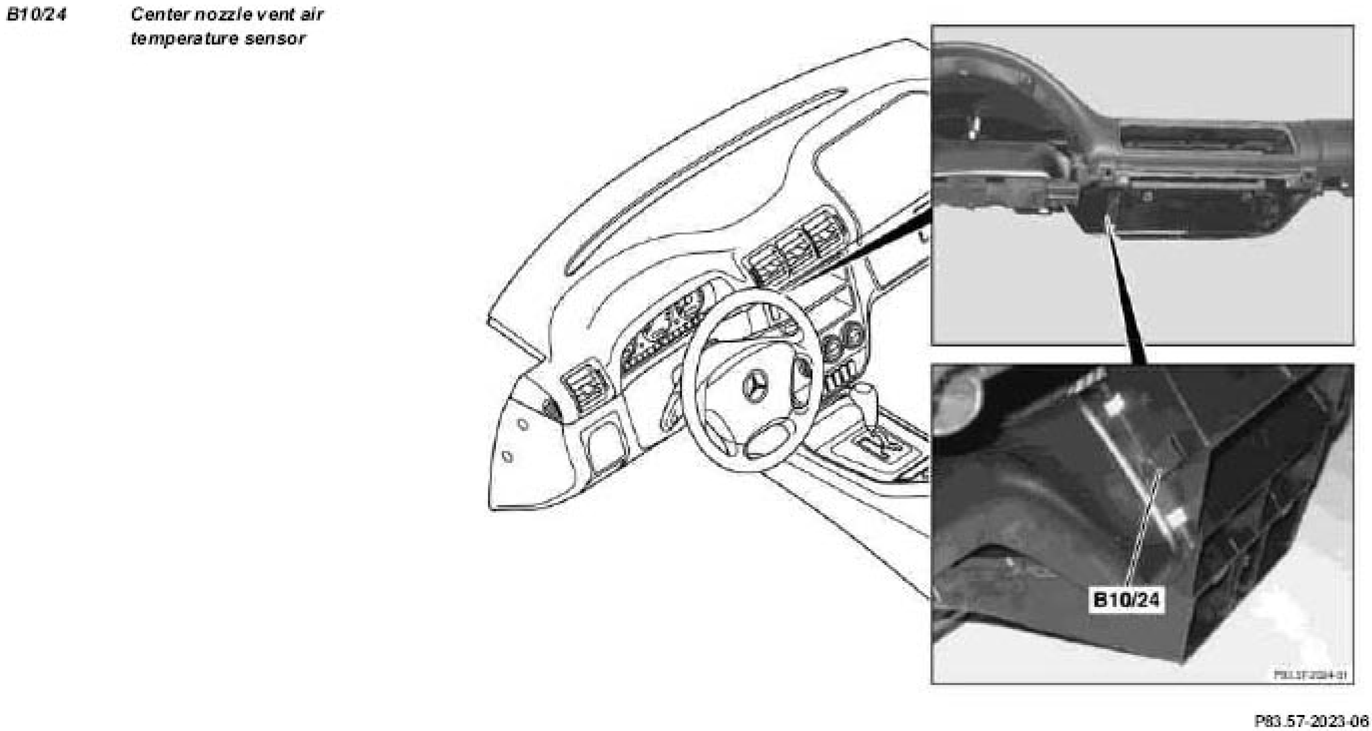


Fig. 126: Identifying Center Nozzle Vent Air Temperature Sensor

Center nozzle vent air temperature sensor, location	The center nozzle vent air temperature sensor (B10/24) is located to the left of the air duct's center nozzle below the instrument panel.
Center nozzle vent air temperature sensor, task	The center nozzle vent air temperature sensor (B10/24) records the temperature of the air flowing out of the center nozzle and sends it to the AAC push-button control module (N22).
Center nozzle vent air temperature sensor, function	The vent air's recorded temperature value is compared by the AAC push-button control module (N22) with the setting in the temperature selector wheel whereupon it authorizes a corresponding adjustment to the blending air flap to be made depending upon the result.

FRONT FOOTWELL VENT AIR TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2117GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

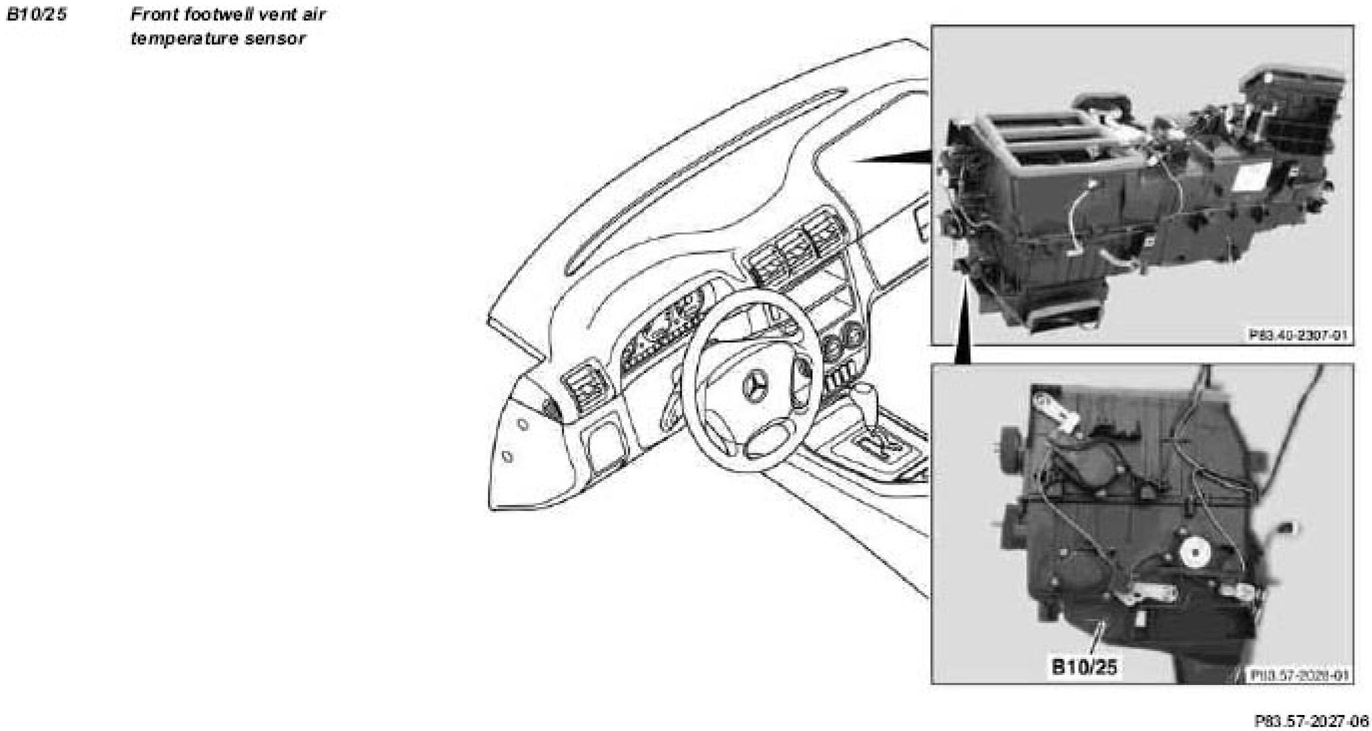


Fig. 127: Identifying Front Footwell Vent Air Temperature Sensor

Front footwell vent air temperature sensor, location	The front footwell vent air temperature sensor (B10/25) is located to the left of the automatic air conditioning box below the instrument panel.
Front footwell vent air temperature sensor, task	The front footwell vent air temperature sensor (B10/25) records the temperature of the air flowing in the front footwell and sends it to the AAC push-button control module (N22).
Front footwell vent air temperature sensor, function	The vent air's recorded temperature value is compared by the AAC push-button control module (N22) with the setting in the temperature selector wheel and authorizes a corresponding adjustment to the blending air flap to be made depending upon the result.

REAR AIR STREAM TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2118GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

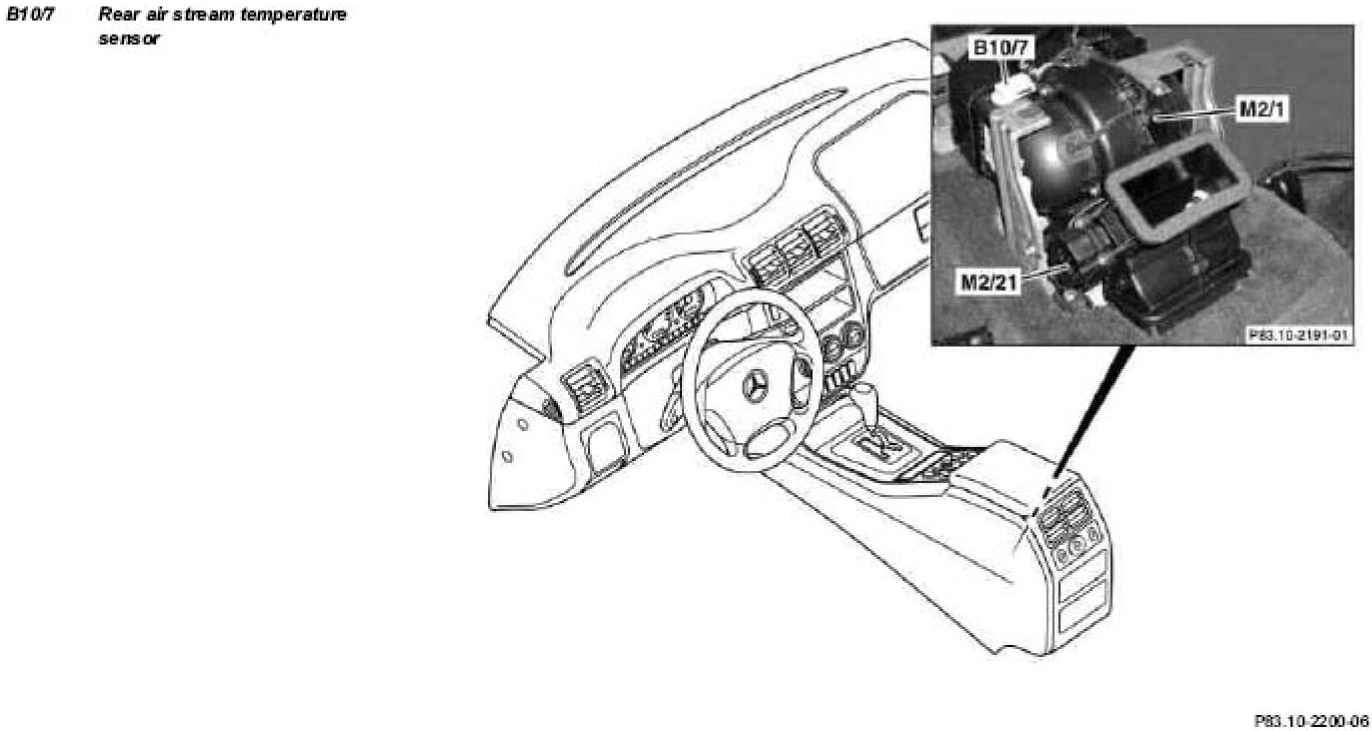


Fig. 128: Identifying Rear Air Stream Temperature Sensor

Rear air stream temperature sensor, location	The rear air stream temperature sensor (B10/7) is located to the left of the rear passenger compartment blower motor housing behind the rear nozzle.
Rear air stream temperature sensor, task	The rear air stream temperature sensor (B10/7) records the temperature of the air flowing in the rear passenger compartment and sends it to the AAC push-button control module (N22).
Rear air stream temperature sensor, function	The recorded temperature value for the rear ventilation air stream is compared by the AAC push-button control module (N22) with the setting in the temperature selector wheel and authorizes a corresponding adjustment to the blending air flap to be made depending upon the result.

AMBIENT TEMPERATURE DISPLAY TEMPERATURE SENSOR, FUNCTION - GF83.57-P-2119-01GI

Function

The resistance of the ambient temperature display temperature sensor is dependent on the ambient temperature and speed. The current resistance value is sent via the CAN data bus to the AAC push-button control module (N22), which then slightly readjusts the set temperature.

The fact that the ambient temperature is dependent on the speed helps to prevent any excess temperature being sent to the AAC push-button control module (N22) when the car is at a standstill or traveling slowly, e.g. as induced by engine heat radiation.

When switching the ignition on or off and at speeds of less than 20 km/h the last measured temperature value is used.

At ignition OFF, the last ambient temperature used for the control operation is stored.

AMBIENT TEMPERATURE DISPLAY TEMPERATURE SENSOR, LOCATION/TASK/FUNCTION - GF83.57-P-2119GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

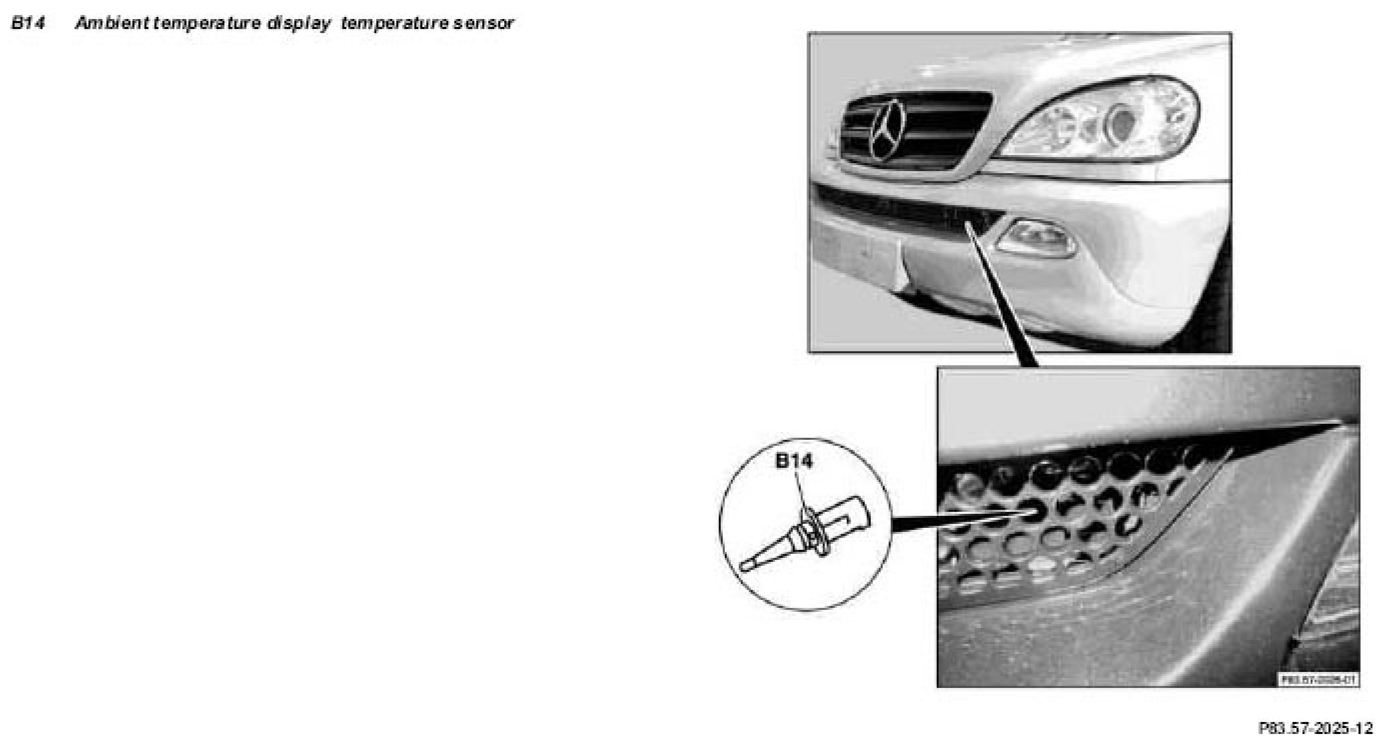


Fig. 129: Identifying Ambient Temperature Display Temperature Sensor

	Ambient temperature display temperature sensor, location	The ambient temperature display temperature sensor (B14) is located on the front left side of the bumper.	
	Ambient temperature display temperature sensor, task	The ambient temperature display temperature sensor (B14) determines the ambient temperature.	
	Ambient temperature display temperature sensor, function		**GF83.57-P-2119-01GI**

RESIDUAL ENGINE HEAT UTILIZATION SYSTEM, FUNCTION - GF83.75-P-2000GI

MODEL 163 as of 1.9.01 with CODE (580a) Automatic air conditioning

Function

The residual engine heat utilization system allows the vehicle to be heated even when the ignition is switched

OFF . To this end the system uses the residual heat of the engine. The residual engine heat is dissipated to the coolant and routed through the heat exchanger with the aid of the heating water circulation pump. The air drawn in by the blower motor is routed around the heat exchanger, whereby it is then warmed up. The heated air is then routed over the air outlets into the passenger compartment.

The residual engine heat utilization system can only be used when the ignition is switched OFF.

Once the Rest push-button ( ) on the AAC push-button control module (N22) has been pressed the following program sequence is run:

- Blending air flaps are automatically controlled
- Heating water circulation pump ON
- The blower's control voltage is limited to a maximum value of 5 Volt.

End of program

- Pressing the Rest push-button ( )
- Timeout of 30 minutes period (repeated operation possible)
- Protection against undervoltage at a battery voltage of less than 11 V (LED flashes)
- Ignition ON

During the residual engine heat utilization function no function keys are accepted apart from the Rest push-button ( ) and the set point adjusters.

	Rest push-button, location/task/function		GF83.40-P-2148GI
	Heating water circulation pump, location/task/ function		GF83.20-P-2109GI
	Heating system heat exchanger, location/ purpose/function		GF83.20-P-2108GC
	Blower motor, location/task/design/function		GF83.10-P-2170GI
	Blending air flap actuator, location/task/function		GF83.57-P-2112GI

SAFETY PRECAUTIONS

RISK OF EXPLOSION CAUSED BY WELDING OR SOLDERING WORK ON CLOSED AIR CONDITIONING SYSTEM. RISK OF POISONING CAUSED BY INHALING OVERHEATED REFRIGERANT VAPORS. RISK OF INJURY TO SKIN AND EYES CAUSED BY CONTACT WITH LIQUID REFRIGERANT. - AS83.00-Z-0001-01A

Never perform welding work on or near a closed air conditioning system. No smoking or open flames. Wear safety glasses and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.

Potential risks

Risk of explosion

When closed air conditioning systems (charged or empty) become heated, high pressures are produced that can

ultimately cause the system to burst. For this reason, all **welding and soldering operations** on or near closed air conditioning systems are prohibited. High pressure levels can combine with refrigerant vapors to produce a mixture that is potentially explosive when exposed to atmospheric air.

Risk of poisoning

Refrigerant can decompose when overheated. The resulting substances are toxic and should never be inhaled.

Risk of injury

Refrigerant vapors are heavier than air; this means that escaping gases pose a risk of suffocation for anyone in a work pit beneath the vehicle.

Contact with liquid refrigerant may cause chilblain-like damage to the skin (due to under-cooling).

Safety instructions/precautions

- All **welding, brazing and soldering operations** on sealed air conditioning systems and in their immediate vicinity are prohibited.
- Never smoke when working with refrigerant, never expose refrigerant to open flames.
- A **piercing odor** can indicate overheated refrigerant - never inhale these vapors. Leave closed rooms immediately and ventilate thoroughly.
- All refrigerant must be evacuated from the entire air conditioning system prior to doing any **repair work** on the air conditioning circuit or components.
- Because it poses a hazard to the atmosphere as well as to personal health and safety, discharging refrigerant directly into the air is prohibited.
- Suitable evacuation, treatment and charging devices equipped with integral disposal and treatment facilities must be used for evacuating refrigerant.
- Even after the system has been evacuated, residual pressure may still be present in the system when loosening couplings. Therefore, loosen the couplings carefully, so that the pressure can dissipate slowly.
- Avoid all contact with liquid refrigerant.
- Always wear safety glasses and protective gloves when working with refrigerant.

First aid measures

In case of eye contact

- Immediately flush with plenty of running water and consult a physician.

In case of skin contact

- Consult a physician immediately in case of frostbite. In case of inhalation
- of concentrated refrigerant, immediately take victim out into the fresh air and keep victim calm.

- If the victim's breathing is shallow, or the individual has stopped breathing altogether, tilt the head back and administer artificial resuscitation. Call a doctor.

In case of ingestion

- Consult a physician immediately.

SAFETY INFORMATION: CLIMATE CONTROL - AS83.00-Z-9999ZZ

MODEL all

i	Risk of explosion. Explosions may result when performing welding or soldering work on a closed air conditioning system. Risk of poisoning. Poisoning may result from inhaling overheated refrigerant vapors. Risk of injury. Contact with liquid refrigerant may result in injury to the skin and eyes.	MODEL 240	AS83.00-P-0001-01H
i	Risk of death caused by contact with current conducting parts when repairing parts of the external power supply	MODEL 639, 903 ...	AS83.00-Z-0002-01A
i	Risk of explosion caused by welding or soldering work on closed air conditioning system. Risk of poisoning caused by inhaling overheated refrigerant vapors. Risk of injury to skin and eyes caused by contact with liquid refrigerant.	MODEL all	**AS83.00-Z-0001-01A**
i	Hazard from contact with parts conducting high voltages.	MODEL all with CODE (H25) Eberspacher D 30 W with CODE (H26) Webasto DW 300	AS83.70-Z-0001-01A
i	Risk of explosion caused by fuel vapors igniting, risk of poisoning caused by inhaling combustible gases and risk of injury caused by burns during and after operation of heater unit	MODEL all with heater, additional heating or stationary heating	AS83.70-Z-0002-01A
i	Risk of explosion from liquefied petroleum gas flowing out and from fuel vapors. Risk of poisoning from inhaling combustion gases.	BODY 940, 972 ...	AS83.70-Z-0004-01A
i	Risk of poisoning due to inhalation of heater exhaust gases	MODELS 901, 902, 903, 904, 905 for underfloor heaters	AS83.70-Z-0005-01A

TROUBLE DIAGNOSIS

AIR CONDITIONING SOMETIMES DOES NOT WORK - AF83.30-P-6000B

MODEL 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210

Modification notes

1.9.99	Supersedes STIP 83.30-007 dated 15.8.97		

Damage code	Cause	Remedy
83 751	Pressure sensor (B12) occasionally indicates wrong pressure value to control and operating module (N19/22) (depending on temperature).	1 Connect pressure gauge and HHT.
	Air conditioning/automatic air conditioning occasionally does not function, refrigerant compressor does not run.	2 Call up air conditioning actual values with HHT.
		3 Compare refrigerant pressure between pressure gauge (high pressure side) and HHT.
		If pressure difference is greater than 2 bars.? 4 Remove/install/replace pressure sensor on receiver/drier.

Parts ordering notes

Part no.	Designation	Quantity
140 830 00 72	Pressure sensor	As required

INSUFFICIENT AIR CONDITIONING DURING IDLING - AF83.30-P-6007A

MODEL 163.154 #A up to 289564, 163.154 #X, 163.136 /172 with CODE (580) Air conditioning or Tempmatic for USA

Modification notes

21.6.04	Work steps 1-2 erased		

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text	Time	Acc. no.	Code
P	023731	Install modified wiring harness for auxiliary fan (after checking)	015 WU	-	-

Damage code	Cause	Remedy	
50 041 73	Fuse f44 blows due to repeated switch-on of additional fan	1 Check whether service auxiliary wiring harness (2) for additional fan has already been installed The original additional fan connector (M4x1) is already fastened next to the new additional fan connector (3) with adhesive tape.	
		If auxiliary wiring harness (2) is already installed: ? 2 Ensure that a **40 A fuse is located at position f44**	

		If an auxiliary wiring harness (2) has not yet been installed: ? 3 Install auxiliary wiring harness.	**SM83.30-P-0009GH**
		If an additional wiring harness and a 40 A fuse are already installed and the auxiliary fan does not function: ? 4 Perform corresponding diagnosis and repair.	

1	Ground cable, auxiliary wiring harness
2	Auxiliary wiring harness
3	Additional fan connector, new
4	Wiring harness for fuse and relay module
5	Wiring harness
6	Clip
F1	Fuse and relay module
M4x1	Additional fan connector
ML/B	Plug connector, blue
W9	Ground (at left headlamp unit)

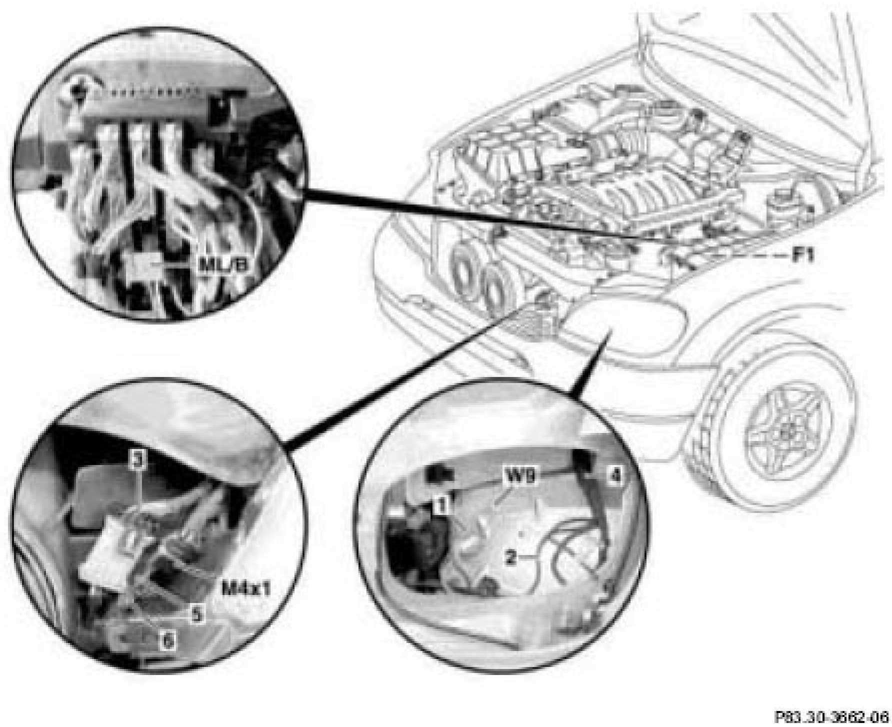


Fig. 130: Identifying Fuse And Relay Module, Additional Fan Connector And Plug Connector, Blue

NO REFRIGERATION/HEAT FROM AUTOMATIC AIR CONDITIONER - AF83.40-P-3400A

MODEL 163.### #A as of 289565 up to 458809, 163.### #X as of 754620 up to 777100

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text	Time	Acc. no.	Code
P	831917	Replace air conditioning operating unit	014 WU	-	-

Damage code	Cause	Remedy	
83 491 90	The air mixing flap is not actuated by the AAC [KLA] control and operating unit (N22) because the voltage in the vehicle electrical system is too low during cold start.	1 Replace AAC [KLA] control and operating	**AR83.40-P-**

	☒ This fault occurs only on AAC [KLA] control and operating units (N22) with part number **A163 820 25 89, A163 820 28 89, A163 820 42 89** and **A163 820 43 89**	unit (N22)	**6500GH**

Parts ordering notes

Part no.	Designation	Quantity
163 820 49 89	ECE AAC [KLA] control and operating unit	1
163 820 50 89	USA AAC [KLA] control and operating unit	1

HEATER DOES NOT FUNCTION - AF83.40-P-6008A

MODEL 163.154 /174 /175 #A as of 289565 up to 348398 with CODE (494) USA version with CODE (580) Automatic air conditioning

MODEL 163.113 /154 /174 /175 #A as of 289565 up to 348412, 163.113 /128 #X as of 754620 up to 772006 except CODE (494) USA version with CODE (580) Automatic air conditioning

Modification notes

12.5.04	Information revised in step 11; WE table added; part number revised		

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text
P	023610	Perform diagnosis on left air mixing flap actuator motor (M2/6)

Damage code	Cause	Remedy	
83 491 90	The automatic air conditioning control unit (N22) does not communicate with the blending air flap actuator motor (M2/6).	1 Connect STAR DIAGNOSIS and perform short test.	**AD00.00-P-2000-04A *WH58.30-Z-1048-13A**
		☒ If fault codes are present: ? 2 Perform diagnosis and repair according to fault code description.	
		☒ If NO fault codes are present: ? ☒ Perform following test when engine is cold.	
		3 Select "Actual values" with STAR DIAGNOSIS under "Automatic air conditioning".	
		4 Select "M2/6 (blending air flap actuator motor)".	
		5 Set temperature control to maximum cooling and wait 30 seconds Observe the actual value of the blending air flap actuator motor (M2/6) and switch over the temperature control switch to maximum heating.	

		☒ If the actual value changes, there are not faults present in the automatic air conditioning control unit. 6 Perform further diagnosis and repair correspondingly.	
		☒ If actual value remains unchanged: ? 7 Remove/install/replace automatic air conditioning control unit.	**AR83.40-P-6500GH**
		8 Install components removed in opposite order.	
		9 Select "Control module adaptation" with STAR DIAGNOSIS under "Automatic air conditioning".	
		10 Select "Read coding and change if necessary".	
		11 Adjust "National version" according to customer's request ☒ Settings for blower and temperature: ? "Rest of the world". = Minimum "USA" = Standard "----" = Maximum	
		12 Adjust "LED dimming" according to "SERIES"	
		13 Adjust further coding according to vehicle specifications.	

Commercially available tools

Number	Designation
WH58.30-Z-1048-13A	STAR DIAGNOSIS diagnosis system, Compact Passenger Car 6511 1801 00

Parts ordering notes

Part no.	Designation	Quantity
163 820 49 89	Switch unit/automatic air conditioning control unit, ECE	1
163 820 50 89	Switch unit/automatic air conditioning control unit, USA	1

SELF-DIAGNOSTIC SYSTEM

HEATER, DIAGNOSIS, CONTENTS - AD83.20-P-1000GHZ

MODEL 163

K 1.8 [] 11	Heater, diagnosis, basic knowledge		**AD83.20-P-2000GH**
K 1.8 [] 12	Heater, diagnosis, function check		**AD83.20-P-3000GH**

DIAGNOSIS TOOLS, HEATER - AD83.20-P-2000-01GC

Commercially available tools

Number	Designation

WH58.30-Z-1002-08A	Digital temperature measuring instrument (measuring range -20° to +70°)
WH58.30-Z-1004-08A	Air temperature probe

HEATER, DIAGNOSIS, BASIC KNOWLEDGE - AD83.20-P-2000GH

MODEL 163

AP	Electric wiring diagrams, location of ground points and connectors		PE83.00-P-1100E
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Diagnosis tools, heater		**AD83.20-P-2000-01GC**

HEATER CAPACITY, FUNCTION CHECK, HEATER - AD83.20-P-3000-01GH

Test sequence

- Heater switch (2) on "red" stop
- Blower switch (1) on stage 4
- Air distribution switch (3) in 12 o'clock position
- Recirculated air button ( ) not pressed (LED does not come on)
- Test period > 5 minutes
- Engine speed 2000 rpm
- Engine coolant temperature > 80°C
- Danger! Read out temperature measuring instrument (4)

  Temperature display > 55°C

If the measured values stated above are not achieved, the following components and functions should be checked:

- Engine coolant temperature
- Furring in cooling system and heat exchanger
- Blend air flap function
- Coolant circulation pump (M13)

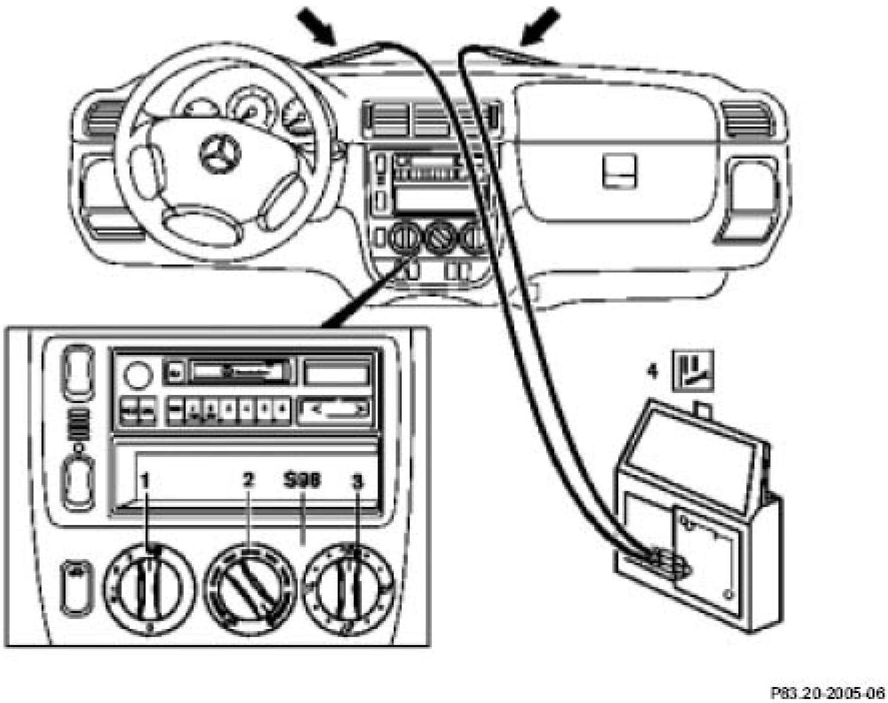


Fig. 131: Identifying Heater Capacity, Function Check, Heater

HEATER, DIAGNOSIS, FUNCTION CHECK - AD83.20-P-3000GH

MODEL 163

	Heater, diagnosis, basic knowledge		**AD83.20-P-2000GH**
	Check fuses F1/6, F1/41, F1/43		
	Allow engine to idle at operating temperature (approx. 80°C engine coolant temperature) throughout the entire test period		
	Outside temperature > 15°C		
	Open center and side air outlets manually		
	Recirculated air button ( ) is not pressed (LED does not come on)		
	Blower switch on stage 4		
	Function check		
Test step/Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/ Remedy**
1 **No heat**	Heater switch on "blue" stop	Air outlets, unheated air	• Wire cable for actuating blend air flap

			• Heater push-button unit
2 **Full heat**	Heater switch on "red" stop	Air outlets, heated air	• Wire cable for actuating air blend flap • Heater push-button unit
3 **Recirculated air mode**	Heater switch in any position Recirculated air button ( ) is pressed (LED comes on)	Air flow from center outlet increases noticeably	• Cables • Recirculated air button • Actuator motor for recirculated air flap element (M39) • Heater push-button unit
4 **Heat output**	Connect temperature measuring instrument Heater switch on "red" stop	Air outlet temperature at defroster outlet > 55°C	• Engine coolant temperature • Hot water coolant circulation pump • Furring in cooling system and heat exchanger
		Test sequence	**AD83.20-P-3000-01GH**

AIR CONDITIONING (TEMPMATIC) DIAGNOSIS CONTENTS - AD83.30-P-1000GHZ

MODEL 163 with CODE (580) Air conditioning or for USA, Tempmatic

K 2.6 [] 11	Air conditioning (Tempmatic) (Tempmatic A/C) diagnosis, previous knowledge	**AD83.30-P-2000GH**
K 2.6 [] 12	Air conditioning (Tempmatic) (Tempmatic A/C) diagnosis, function check	**AD83.30-P-3000GH**
K 2.6 [] 13	Air conditioning (Tempmatic) (Tempmatic A/C) diagnosis, function check actual values	**AD83.30-P-3001GH**
K 2.6 [] 14A	Air conditioning (Tempmatic) (Tempmatic A/C) diagnosis, fault memory	**AD83.30-P-4000GH**
K 2.6 [] 21	Air conditioning (Tempmatic) (Tempmatic A/C), testing electrical system	**AD83.30-P-6000GH**

AIR CONDITIONING (TEMPMATIC) PRECONDITIONS FOR OPERATIONAL CHECK - AD83.30-P-2000-01GH

up to 30.11.99

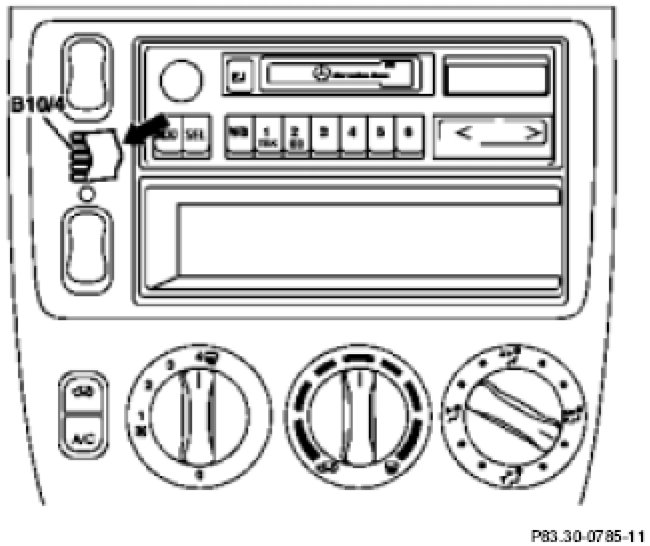


Fig. 132: Locating In-Car Temperature Sensor With Aspirator Nozzle

1. Check condition of fuses F16, F41, F43, F44.
2. Check aspirator nozzle for in-car temperature sensor as follows: With ignition switched on, place a piece of paper (arrow) of 1cm surface area on grill in front of in-car temperature sensor with aspirator nozzle (B10/4). With sufficient ventilation (aspirator nozzle to blower), paper remains on grill.
3. Allow engine to idle at operating temperature (engine coolant temperature approx. 80°C) during the complete duration of the test.
4. Outside temperature > 15°C.
5. Open center and side air outlets manually.
6. Recirculated air switch  not pressed.
7. Set blower switch to stage 4.

AIR CONDITIONING (TEMPMATIC) PRECONDITIONS FOR OPERATIONAL CHECK - AD83.30-P-2000-01GK

as of 1.12.99

B 10/4 In-car temperature sensor with aspirator blower

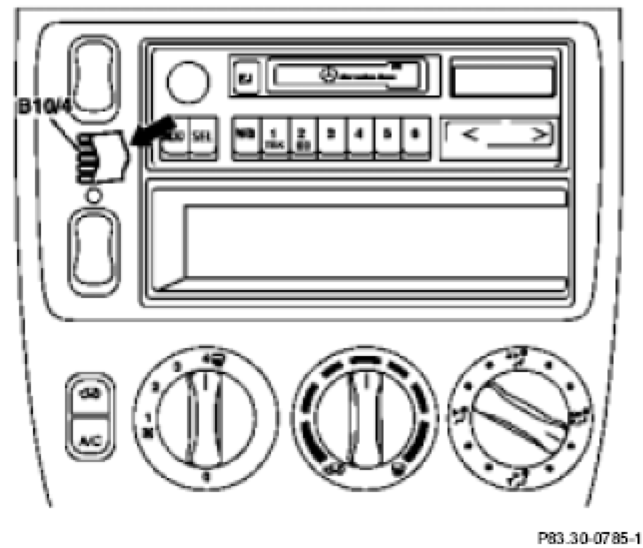


Fig. 133: Locating In-Car Temperature Sensor With Aspirator Blower

1. Check status of fuses F16, F41, F43, F44.
2. Check aspirator blower for in-car temperature sensor: With ignition switched on, place a piece of paper (arrow) of 1cm surface area on grill in front of in-car temperature sensor (B10/4) with aspirator blower. With sufficient ventilation (aspirator blower to blower), paper remains on grill.
3. Allow engine to idle for entire duration of test at operating temperature (approx. 80°C coolant temperature).
4. Outside temperature > 15°C
5. Open center and side nozzles manually.
6. Recirculating air switch not pressed.
7. Blower switch on step 1.

Observe run-on time.

AIR CONDITIONING (TEMPMATIC) VERSION CODING - AD83.30-P-2000-02GH

Variant coding is carried out by the HHT and is menu-assisted. Communication is possible as soon as the ignition key is inserted in the ignition lock (the ignition lock position is not important). Variant coding (position 1) is reached from the main menu via control module adaptations (position 5). The following two options are available in variant coding:

1. Read out coding and transfer to new control module.
2. Readout/change coding.

Position 2 must be selected in order to read out the air conditioning coding. The air conditioning variant coding is found under position 07 in the following listing.

Here a selection can be made between:

1. fitted and
2. not fitted

Coding options	Selection
Air conditioning	fitted/not fitted

AIR CONDITIONING (TEMPMATIC) NOTES ON FAULT MEMORY - AD83.30-P-2000-03GH

A particular numerical code is assigned to each fault (short-circuit, open-circuit, etc.) which distinguishes between current faults and faults which occur temporarily.

When determining faults, the push-button control unit (N19) cannot always distinguish between short-circuit and disconnected cables.

If no fault code is displayed, but there is a complaint, a tolerance deviation of components can exist. Since such a deviation is not recorded by the fault memory, the appropriate test steps are to be checked with the socket box and Multimeter.

AIR CONDITIONING (TEMPMATIC) DIAGNOSIS TOOLS - AD83.30-P-2000-04GH

Commercially available tools

Number	Designation	
WH58.30-Z-1036-13A	Handheld tester (HHT)	651 100 01 99
WH58.30-Z-1037-13A	Test cable (multiplexer)	651 100 40 99

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM TOOLS - AD83.30-P-2000-06GH

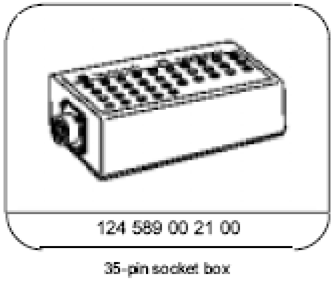


Fig. 134: Identifying 35-Pin Socket Box (124 589 00 21 00)

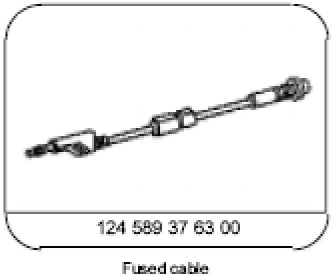


Fig. 135: Identifying Fused Cable (124 589 37 63 00)

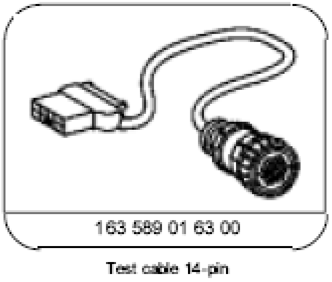


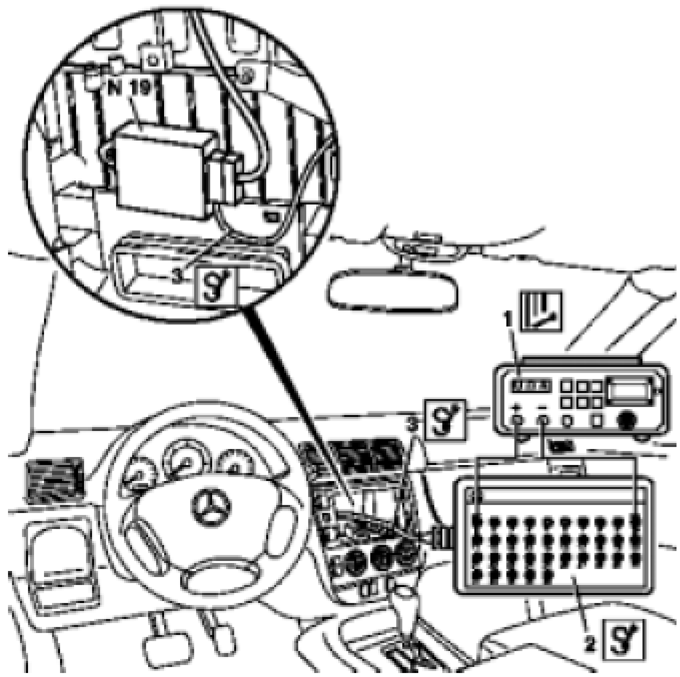
Fig. 136: Identifying Test Cable 14-Pin (163 589 01 63 00)

Commercially available tools

Number	Designation
WH58.30-Z-1001-09A	Multimeter

AIR CONDITIONING (TEMPMATIC) SOCKET BOX CONNECTION DIAGRAM - AD83.30-P-2000-07GH

1 Multimeter
2 Socket box
3 Test cable
N19 A/C pushbutton control module



P83.30-0790-12

Fig. 137: Identifying Air Conditioning (Tempmatic) Socket Box Connection Diagram

AIR CONDITIONING (TEMPMATIC) DIAGNOSIS PREVIOUS KNOWLEDGE - AD83.30-P-2000GH

MODEL 163 with CODE (580) air conditioning or for USA, Tempmatic

	Air conditioning system, location of components		**GF83.30-P-0003-01GH**
AP	Survey of electrical wiring diagrams for air conditioning		PE83.00-P-1100E
	Connection and use of test equipment		**AD00.00-P-1000AZ**
	Notes on air conditioning (Tempmatic) (TAC) fault memory		**AD83.30-P-2000-03GH**
	Pre-conditions for function check of air conditioning (Tempmatic) (TAC)	up to 30.11.99	**AD83.30-P-2000-01GH**
	Pre-conditions for function check of air conditioning (Tempmatic) (TAC)	as of 01.12.99	**AD83.30-P-2000-01GK**
	Variant coding, air conditioning (Tempmatic) (TAC)		**AD83.30-P-2000-02GH**
	Socket box connection diagram, air conditioning (Tempmatic) (TAC)		**AD83.30-P-2000-07GH**
	Air conditioning (Tempmatic) (TAC) diagnostic tools		**AD83.30-P-2000-04GH**
	Tools, testing electrical system of air conditioning (Tempmatic) (TAC)		**AD83.30-P-2000-06GH**

AIR CONDITIONING (TEMPMATIC) DIAGNOSIS OPERATIONAL CHECK - AD83.30-P-3000GH

MODEL 163 with CODE (580) air conditioning or for USA, Tempmatic

	Air conditioning (Tempmatic) (Tempmatic A/C) diagnosis, previous knowledge		**AD83.30-P-2000GH**
	Function check		
Test step/Scope of test	**Operation/Requirement**	**Specified value**	**Possible cause/ Remedy**
1 **Air drying**	Temperature selector on "white zone" (⚠ Danger!) function switch illuminated Air distribution switch at 12 o'clock	Air from center level. Air upwards. A/C compressor **ON** .	**AD83.30-P-6000-01GH** **AD83.30-P-6000-02GH** **AD83.30-P-6000-03GH** **AD83.30-P-6000-04GH** **AD83.30-P-6000-05GH** **AD83.30-P-6000-06GH** **AD83.30-P-6000-07GH** **AD83.30-P-6000-08GH** **AD83.30-P-6000-09GH**
2 **Normal setting in control mode**	Temperature selector on "white zone" ⚠ Danger! function switch illuminated Air distribution switch at 4 o'clock	Air downwards and upwards. A/C compressor **ON** . Flow of temperature-controlled air from center level as well. Coolant circulation pump runs.	**AD83.30-P-6000-08GH** **AD83.30-P-6000-09GH**
3 **Normal mode without heating mode**	Temperature selector engaged on "blue" ⚠ Danger! function switch not illuminated Air distribution switch at 9 o'clock	Air from center level (ambient air) A/C compressor OFF.	**AD83.30-P-6000-08GH**
4 **Normal mode in heating mode**	Temperature selector on "red" stop ⚠ Danger! function switch not illuminated Air distribution switch at 4 o'clock	Heated air downwards, upwards and from center level. A/C compressor **OFF.**	**AD83.30-P-6000-08GH**

5 **Recirculated air mode**	function switch illuminated Blower switch on stage 4	Blower noise increases significantly	• Cables • Recirculated air switch • Fresh air/recirculated air flap actuator motor

AIR CONDITIONING (TAU) DIAGNOSIS FUNCTION CHECK ACTUAL VALUES - AD83.30-P-3001GH

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

	Air conditioning (TAU) diagnosis previous knowledge		**AD83.30-P-2000GH**
	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Model 163 up to 31.8.01	**AD00.00-P-2000-03C**
	Operational check		
Test scope	**Operation / Requirement**	**Specification**	**Possible cause / Remedy**
01 **Circuit 30**		11-14 V	• Wiring • Battery
02 **Engine temperature**	Ignition **ON** Start engine and warm up to operating temperature.	Operating temperature approx. 80°C	• Wiring • Temperature sensor Coolant (B11/4) • All-activity module (N10)
03 **Outside temperature**	Ignition **ON**	Season-dependent, approx. 20° C	• Wiring • Temperature sensor Ambient air (B14) • All-activity module (N10)
04 **Blower power supply relay (F1k21)**	Ignition **ON** Blower stage 4	ON FROM	• Wiring • F1k21 • Blower motor (M2) • All-activity module (N10)
05 **Auxiliary fan relay**	Ignition **ON**	ON FROM	• Wiring • F1k26 • Auxiliary fan (M4)

(F1k26)			• All-activity module (N10)
08 **Heating water circulation pump relay (F1k19)**	Ignition **ON**	ON FROM	• Wiring • F1k19 • Heating water circulation pump (M13) • All-activity module (N10)
09 **Refrigerant pressure**	Start engine ⚠ Danger! illuminates Blower stage 4	12 bar	**AD83.30-P-6000-09GH**
10 **A/C compressor (A9)**	Start engine ⚠ Danger! illuminates Blower stage 4	ON FROM	**AD83.30-P-6000-08GH** • All-activity module (N10) • A9
11 **Air conditioning request**	Ignition **ON**	YES NO	• Wiring • Control module Air conditioning (N19) • All-activity module (N10)

AIR CONDITIONING (TAU) DIAGNOSTIC FAULT MEMORY - AD83.30-P-4000GH

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

	Air conditioning (TAU) diagnosis previous knowledge		**AD83.30-P-2000GH**
☒	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Model 163 up to 31.8.01 ☒ When a control module's fault memory is read out, all the faults stored in the control module are displayed, which means that fault codes that do not concern the system that is currently being read out can also appear.	**AD00.00-P-2000-03C**
	Fault memory		
Fault code	**Possible cause**	**Note**	**Remedy**
(no communication with HHT possible)	Diagnostic cable		**AD54.21-P-6000-02GH**

No fault code	No fault detected	If there is a complaint in spite of this ? Air conditioning (TAU) electrical system testing	**AD83.30-P-6000GH**
B1232	Refrigerant compressor sensor (B12)		**AD83.30-P-6000-09GH**
B1419	Electromagnetic clutch (A9k1)		• Wiring • A9k1

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM CIRCUIT 15 VOLTAGE SUPPLY - AD83.30-P-6000-01GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Voltage supply Terminal 15**	9 — N19 — 7 (V)	Ignition: **ON**	11 - 14V	• Cables

Fig. 138: Air Conditioning (Tempmatic) Test Of Electrical System Circuit 15 Voltage Supply

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM CIRCUIT 31 GND - AD83.30-P-6000-02GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Ground, terminal 31** Resistance	⊥ — (Ω) — N19 — 9	Ignition: **OFF** Disconnect N19 from	0Ω	• Cables

Fig. 139: Air Conditioning (Tempmatic) Test Of Electrical System Circuit 31 GND

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM IN-CAR TEMPERATURE SENSOR - AD83.30-P-6000-03GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**In-car temperature sensor (B10/4)** Voltage	9 — N19 — 12 (V)	Ignition: **ON** Temperature selector on "red"	°C V 20 1.9	• Cables • B10/4
1.1	**In-car temperature sensor (B10/4)** Resistance	12 — N19 — 2 (Ω)	Ignition: **OFF** Disconnect N19 from	°C kΩ 20 2.1 25 1.7 40 0.9	• Cables • B10/4

Fig. 140: Air Conditioning (Tempmatic) Test Of Electrical System In-Car Temperature Sensor

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM ANTI-ICING TEMPERATURE SENSOR - AD83.30-P-6000-04GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Anti-icing temperature sensor (R35)** Voltage	9 — N19 — 11 (V)	Ignition: **ON**	°C V 0 2.0 - 2.4 15 1.4 - 1.8	• Cables • R35
1.1	**Anti-icing temperature sensor (R35)** Resistance	11 — N19 — 3 (Ω)	Ignition: **OFF** Disconnect N19 from	°C kΩ 6 3.6 15 2.3 22 1.7 25 1.5	• Cables • R35

Fig. 141: Air Conditioning (Tempmatic) Test Of Electrical System Anti-Icing Temperature Sensor

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM TEMPERATURE SELECTOR CONTROL VOLTAGE - AD83.30-P-6000-05GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Temperature drop control voltage** Voltage	9 — N19 — 2 (V)	Ignition: **ON** Turn temperature selector engaged on "blue" to "red" stop	> 2V > 3V	• Cables • S98s2
1.1	**Temperature rise control voltage** Voltage	9 — N19 — 5 (V)	Ignition: **ON** Turn temperature selector engaged on "blue" to "red" stop	> 3V > 4V	• Cables • S98s2

Fig. 142: Air Conditioning (Tempmatic) Test Of Electrical System Temperature Selector Control Voltage

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM BLENDING AIR FLAP SERVO MOTOR CONTROL VOLTAGE - AD83.30-P-6000-06GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Air mixture flap actuator (M16/8)** Voltage	9 — N19 — 1 (V)	Ignition: **ON** Turn temperature selector engaged on "blue" to "red" stop	< 1V 11 - 14V	• Cables • M16/8
1.1	**Air mixture flap actuator (M16/8)** Resistance	8 — N19 — 1 (Ω)	Ignition: **OFF** Disconnect N19 from	0.12 kΩ	• Cables • M16/8

Fig. 143: Air Conditioning (Tempmatic) Test Of Electrical System Blending Air Flap Servo Motor Control Voltage

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM BLENDING AIR FLAP SERVO MOTOR GND - AD83.30-P-6000-07GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Air mixture flap actuator (M16/8)** Voltage	9 — N19 — 8 (V)	Ignition: **ON** Turn temperature selector from "red" stop until "blue" engaged	< 1V 11 - 14V	• Cables • M16/8

Fig. 144: Air Conditioning (Tempmatic) Test Of Electrical System Blending Air Flap Servo Motor GND

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM REFRIGERANT COMPRESSOR ACTUATION - AD83.30-P-6000-08GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Actuation of A/C on switch (S98s3) to A/C pushbutton control module (N19)** Voltage	9 — N19 — 10 (V)	Ignition: **ON** illuminated Blower stage 4 not illuminated or blower stage 0	< 1V 11 - 14V	• Cables • S98s3
1.1	**Actuation of A/C pushbutton control module (N19) to All-Activity Module (N10)** Voltage	9 — N19 — 4 11 — 3 (V)	Ignition: **ON** illuminated Blower stage 4 Install bridge part no. 124 589 37 63 00	> 3V < 1V	• Cables • N19

Fig. 145: Air Conditioning (Tempmatic) Test Of Electrical System Refrigerant Compressor Actuation

AIR CONDITIONING (TEMPMATIC) TEST OF ELECTRICAL SYSTEM REFRIGERANT PRESSURE SENSOR - AD83.30-P-6000-09GH

	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	• Possible cause/Remedy
1.0	**Refrigerant pressure sensor (B12)** Voltage	A — B12 — B (V)	Disconnect connector on refrigerant pressure sensor. Ignition: **ON**	4.75 - 5.25V	• Cable • B12 • N10

Fig. 146: Air Conditioning (Tempmatic) Test Of Electrical System Refrigerant Pressure Sensor

OUTSIDE AIR TEMPERATURE SENSOR, TESTING ELECTRICAL SYSTEM OF TAC - AD83.30-P-6000-24GH

as of 1.12.99

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Outside temperature sensor (B10/5)** Resistance **as of 1.12.99**	3 — N19 — 12	Ignition: **OFF** Disconnect N19 from	°C kΩ 20 2.1 25 1.7 40 0.9 50 0.6	• Cables • B10/5

Fig. 147: Outside Air Temperature Sensor, Testing Electrical System Of TAC

AIR CONDITIONING (TEMPMATIC) ELECTRICAL SYSTEM TESTING - AD83.30-P-6000GH

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

	Air conditioning component arrangement		**GF83.30-P-0003-01GH**
AP	Overview of climate control wiring diagrams		PE83.00-P-1100E
	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Model 163 up to 31.8.01 Erase fault memory in control module (N19) using HHT when testing is complete	**AD00.00-P-2000-03C**
	Air conditioning (Tempmatic) diagnosis previous knowledge		**AD83.30-P-2000GH**
	Air conditioning (Tempmatic) diagnosis function check	The testing of the fresh air/recirculated air flap actuator motor (M39) is carried out during the function check	**AD83.30-P-3000GH**
	Testing		
1	Circuit 15 power supply, air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-01GH**
2	Circuit 31 ground, air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-02GH**
3	In-car temperature sensor, air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-03GH**
4	Anti-icing protection temperature sensor, air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-04GH**
5	Temperature selector wheel control voltage Air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-05GH**
6	Blending air flap servo motor control voltage, air conditioning (Tempmatic) electrical system testing		**AD83.30-P-6000-06GH**
7	Blending air flap actuator motor ground, air conditioning (Tempmatic)		**AD83.30-P-**

	electrical system testing		6000-07GH
8	Refrigerant compressor actuation, air conditioning (Tempmatic) electrical system testing		AD83.30-P-6000-08GH
9	Refrigerant pressure sensor, air conditioning (Tempmatic) electrical system testing		AD83.30-P-6000-09GH
10	Ambient temperature sensor, air conditioning (Tempmatic) electrical system testing	as of 01.12.99	AD83.30-P-6000-24GH

TESTING & REPAIR

TESTING AND REPAIR WORK: PASSENGER CARS: CLIMATE CONTROL - AR83.00-Z-9163AA

MODEL 163

	Remove/install center outlet flap actuator motor	MODEL 163...	AR83.10-P-2019GH
	Removing and installing rear air nozzle	MODEL 163.113/154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175	AR83.10-P-4800GH
	Remove, install switch unit for heater/ ventilation	MODELS 163.113/136/154/172/174 up to 31.8.01 with CODE (580) air conditioning or Tempmatic for USA	AR83.20-P-1835GH
	Remove and install heat exchanger from heater housing	MODEL 163	AR83.20-P-3400GH
	Replace bulbs in push-button control module	MODELS 163.113/154/174/136/172 up to 31.8.01	AR83.25-P-1123GH
	Remove and install series resistor for heater blower	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	AR83.25-P-1250GH
	Remove/install cover at air intake	MODEL 163.113/128 /136 /154 /157 /172 /174 /175	AR83.25-P-1405GH
	Carry out quick test on air conditioning system	MODEL 163, 901, 902, 903, 904 ...	AR83.30-D-1209A
	Draining, evacuating and refilling air conditioning, checking function and checking for leaks	MODEL 163...	AR83.30-P-1760GH
	Remove/install defroster vent flap actuator motor for windshield	MODEL 163.113/154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175	AR83.30-P-2006GH
	Remove/install footwell flap actuator motor	MODEL 163...	AR83.30-P-2007GH
	Remove/install rear shutoff flap actuator motor	MODEL 163.113/154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175	AR83.30-P-2008GH

Remove/install fresh air/recirculated air stepper motor	MODEL 163...	**AR83.30-P-2010GH**
Removing and installing blending air increment adjustment motor	MODEL 163...	**AR83.30-P-2020GH**
Remove and install evaporator housing	MODEL 163...	**AR83.30-P-5200GH**
Disassembling, assembling A/C housing	MODEL 163 with CODE (580) Air conditioning or, in USA, Tempmatic A/C	**AR83.30-P-5201GH**
Correcting oil level in air conditioning following repair or slow refrigerant loss	MODEL 163, 202, 208, 210, 215, 220 ...	**AR83.30-P-5251E**
Correcting oil level in air conditioning after replacing parts	MODEL 163, 202, 208, 210, 215, 220 ...	**AR83.30-P-5252E**
Correcting oil level in air conditioning after system suddenly loses all refrigerant	MODEL 163, 202, 208, 210, 215, 220 ...	**AR83.30-P-5253E**
Remove and install expansion valve	MODEL 163...	**AR83.30-P-5520GH**
Remove/install evaporator	MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA	**AR83.30-P-5540GH**
Remove/install air conditioning blower motor	MODEL 163...	**AR83.30-P-5560GH**
Remove/install blower motor in rear	MODEL 163.113/154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175	**AR83.30-P-5565GH**
Remove/install auxiliary fan	MODEL 163.136 /154 /157 /172 with CODE (580) Air conditioning or Tempmatic for USA	**AR83.30-P-5600GH**
Remove and install receiver/drier	MODELS 163.113/136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA	**AR83.30-P-6520GH**
Remove and install receiver/drier	MODEL 163.128	AR83.30-P-6520GI
Install/remove condenser	MODEL 163...	**AR83.30-P-6540GH**
Remove, install air conditioning control module	MODELS 163.113/136/154/172/174 up to 31.8.01 with CODE (580) air conditioning or Tempmatic for USA	**AR83.30-P-6600GH**
Remove and install evaporator temperature sensor	MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA	**AR83.30-P-8085GH**
Remove/install outside air temperature sensor	MODEL 163...	**AR83.30-P-8086GH**
Remove/install air outlet temperature sensor	MODEL 163...	**AR83.30-P-8087GH**
Remove/install air outlet temperature sensor	MODEL 163...	**AR83.30-P-8087GI**

Remove/install air outlet temperature sensor	MODEL 163...	**AR83.30-P-8087GJ**
Remove, install in-car temperature sensor for aspirator blower (M9)	MODELS 163.113/136/154/172/174 as of 1.9.99 up to 31.8.01	**AR83.30-P-8100GH**
Remove/install switch unit/automatic air conditioning control module	MODEL 163.113/154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175	**AR83.40-P-6500GH**
Remove and install sun sensor	MODEL 163...	**AR83.40-P-6720GH**
Remove/install summer/winter operation switch	MODEL 163, 168, 170, 202, 208 ...	AR83.70-P-0001A
Removing, installing stationary heater antenna	MODEL 163.### 1# Retrofitted stationary heater with Telestart T60	AR83.70-P-0002B
Remove/install stationary heater antenna	MODEL 163.### 1# Retrofitted stationary heater with Telestart T70	AR83.70-P-0002BA
Remove/install Telestart receiver	MODEL 163, 168, 170, 202, 208, 210 ...	AR83.70-P-0003BA
Removing and installing telestart receiver	MODEL 163.### 1# Retrofitted telestart T60	AR83.70-P-0003H
Checking Telestart remote control	MODEL 163, 168, 170, 202, 208, 210 Telestart T60	AR83.70-P-0005A
Check Telestart transmitter	MODEL 163, 168, 170, 202, 203, 208, 209, 210,211,220,463...	AR83.70-P-0005IA
Check emission level, adjust if necessary	MODEL 163, 168, 170, 202, 208, 210 ...	AR83.70-P-1177H
Remove/install heater unit	MODELS 163.136/154/157/172/174/175 1# Retrofitted Thermo Top C stationary heater	AR83.70-P-5302I
Remove/install heater	MODEL 163.113 1# Retrofitted Thermo Top C stationary heater	AR83.70-P-5302IA
Remove/install heater	MODEL 163.128 Retrofitted Thermo Top C stationary heater	AR83.70-P-5302IB
Remove/install combustion air blower unit	MODEL 163, 168, 170, 202, 208, 210 ...	AR83.70-P-5555G
Removing and installing fuel metering pump	MODEL 163.### 1# up to 31.12.99 Retrofitted Thermo Top C stationary heater	AR83.70-P-5652G
Remove/install coolant circulation pump	MODEL 163.### (except 163.128) 1# Retrofitted Thermo Top C stationary heater	AR83.70-P-5700E
Remove/install burner insert	MODEL 163, 168, 170, 202, 208, 210 ...	AR83.70-P-5772G
Remove/install burner insert with glow pin	MODEL 129, 163, 168, 170, 202, 203, 209, 210, 211, 215, 219, 220, 230, 240 ...	AR83.70-P-5773A
Remove/install timer	MODEL 163, 168, 170, 202, 208 ...	AR83.70-P-5892D

Remove/install control module/heat exchanger unit	MODEL 163, 168, 170, 202, 208, 210 ...	AR83.70-P-5935G

REMOVE/INSTALL CENTER OUTLET FLAP ACTUATOR MOTOR - AR83.10-P-2019GH

MODEL 163.113 #A as of 289565, 163.113 #X as of 754620, 163.154 /174 #A as of 289565, 163.128/157/175

1 Screws
M2/22 Center outlet flap actuator motor

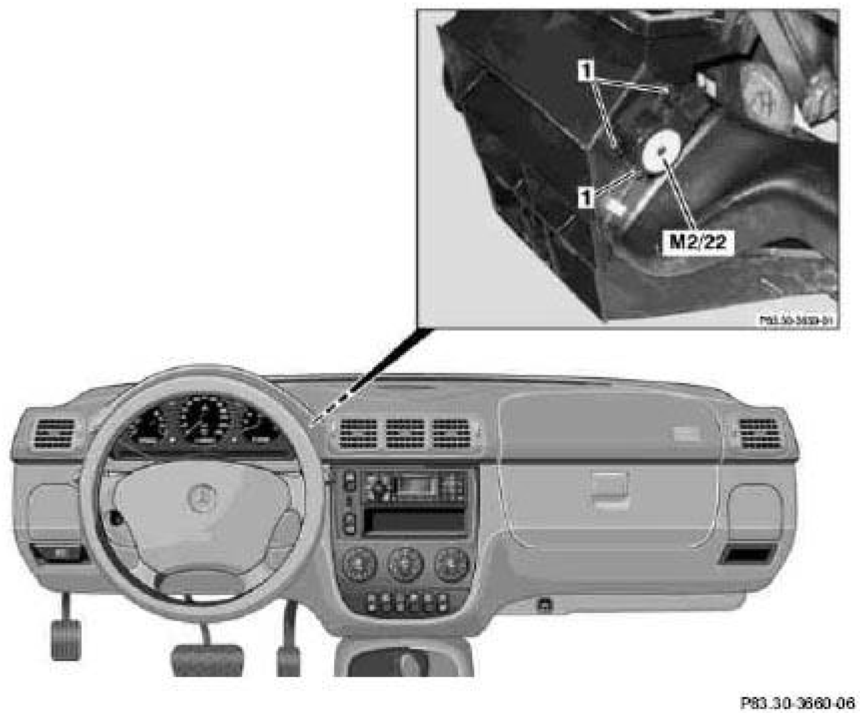


Fig. 148: Identifying Center Outlet Flap Actuator Motor Components

WF AD	**Remove/install**		
1.1	Remove instrument cluster	Left-hand drive vehicle only.	**AR54.30-P-6015GH**
1.2	Remove glove compartment	Right-hand drive vehicle only.	**AR68.10-P-1400GI**
2	Unscrew screws (1)		
3	Remove center outlet flap actuator motor (M2/22) from air duct	**Installation:** Adjust zero position of actuator motor with STAR DIAGNOSIS.	
4	Disconnect connector		
5	Install in the reverse order		

REMOVING AND INSTALLING REAR AIR NOZZLE - AR83.10-P-4800GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

1 Rear center console.
2 Retaining clips
3 Air nozzle

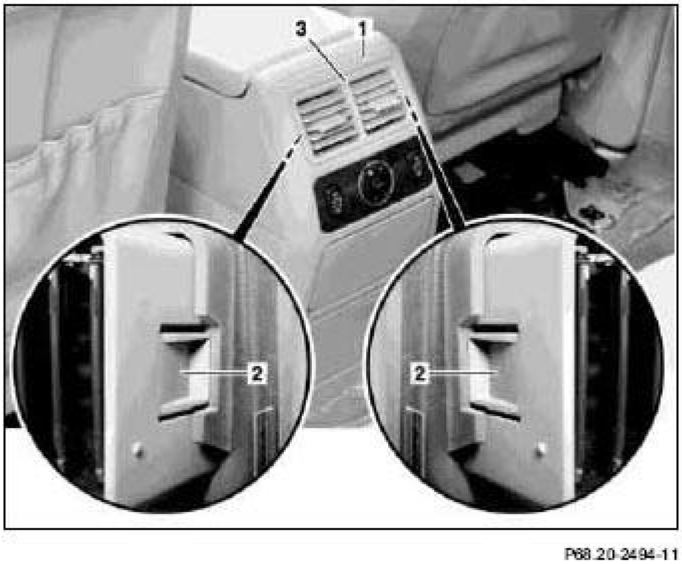


Fig. 149: Identifying Rear Air Nozzle Components

WF AD	Remove/install		
1	Remove rear center console (1)		AR68.20-P-2020GI
2	Loosen retaining clamps (2) on the sides of the air nozzle (3)		
3	Remove air nozzle (3) from the rear center console		
4	Install in the reverse order		

REMOVE, INSTALL SWITCH UNIT FOR HEATER/VENTILATION - AR83.20-P-1835GH

MODELS 163.113/136/154/172/174 up to 31.8.01 with CODE (580) air conditioning or Tempmatic for USA

1	Center part of instrument panel
2	Defroster cable
3	Footwell ventilation cable
4	Pushbutton control module
X72/3	Connector

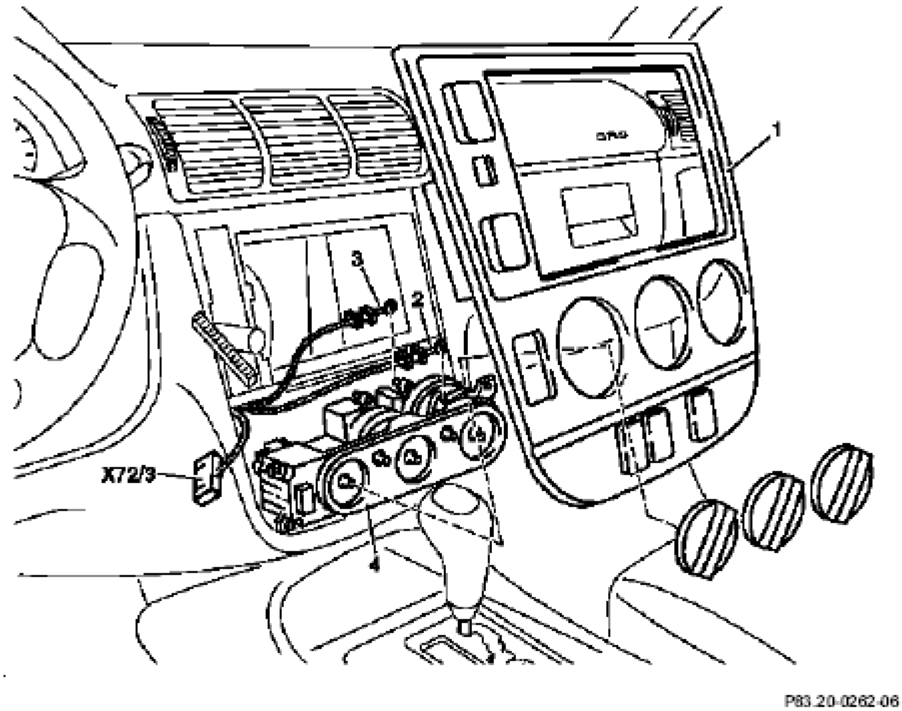


Fig. 150: Identifying Switch Unit For Heater/Ventilation Components

WF AD	**Remove/install**		
1	Remove radio		**AR82.60-P-7502EA**
2	Remove center part of instrument panel (1)		**AR68.10-P-1030GH**
3	Unscrew bolts at heater/AC controls (4) and remove controls		
4	Detach cable (2, 3)	Unclip cables at heater/AC controls.	
5	Disconnect connector (X72/3) at heater/AC controls (4)		
6	Install in the reverse order		

REMOVE AND INSTALL HEAT EXCHANGER FROM HEATER HOUSING - AR83.20-P-3400GH

MODEL 163

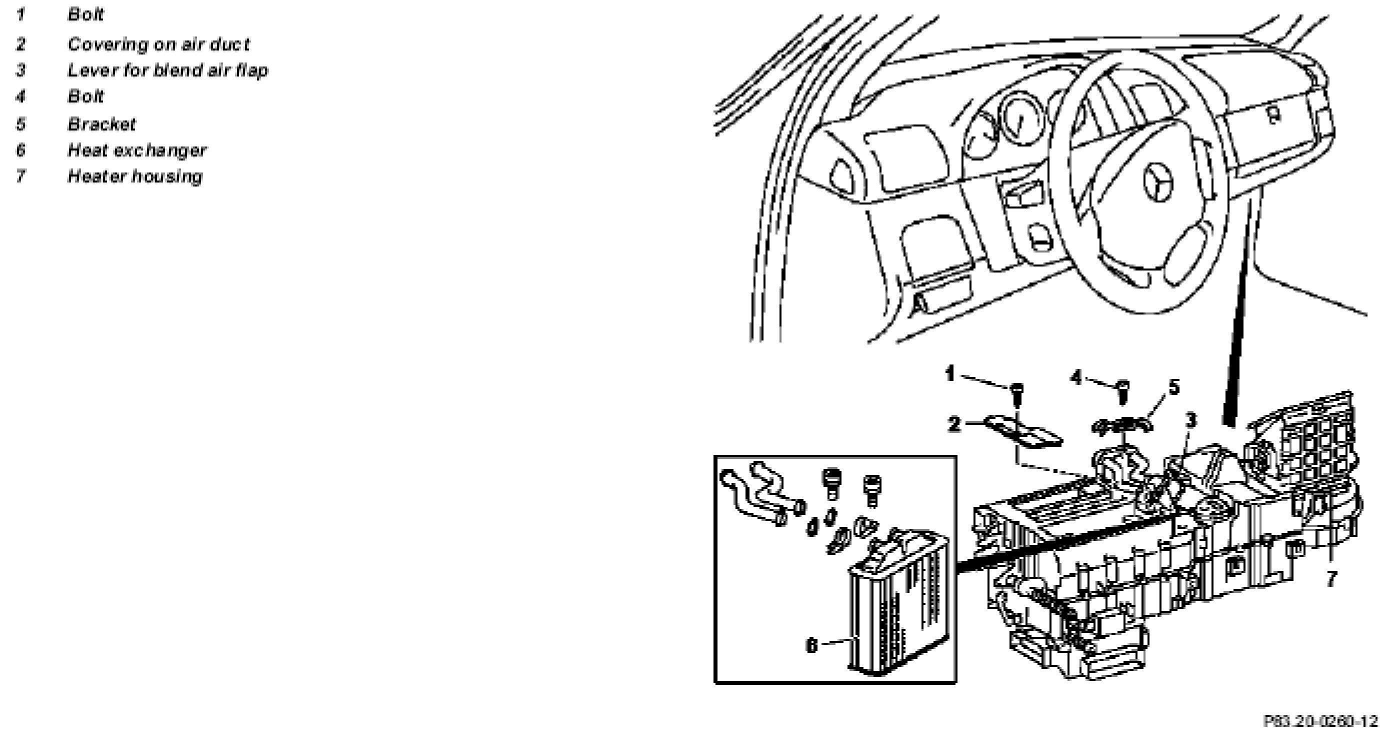


Fig. 151: Identifying Heat Exchanger Components

WF AD	**Remove/Install**		
1	Remove AC housing		**AR83.30-P-5200GH**
2	Remove bolt (1) from the covering on the air duct (2)	The bolt lies under the air duct seal.	
3	Remove lever for blend air flap (3)		
4	Unscrew bolt (4) at bracket (5).		
5	Remove heat exchanger (6) upward		
6	Install in the reverse order		
7	Inspect cooling system for leaks		**AR20.00-P-1010HA**

REPLACE BULBS IN PUSH-BUTTON CONTROL MODULE - AR83.25-P-1123GH

MODELS 163.113/154/174/136/172 up to 31.8.01

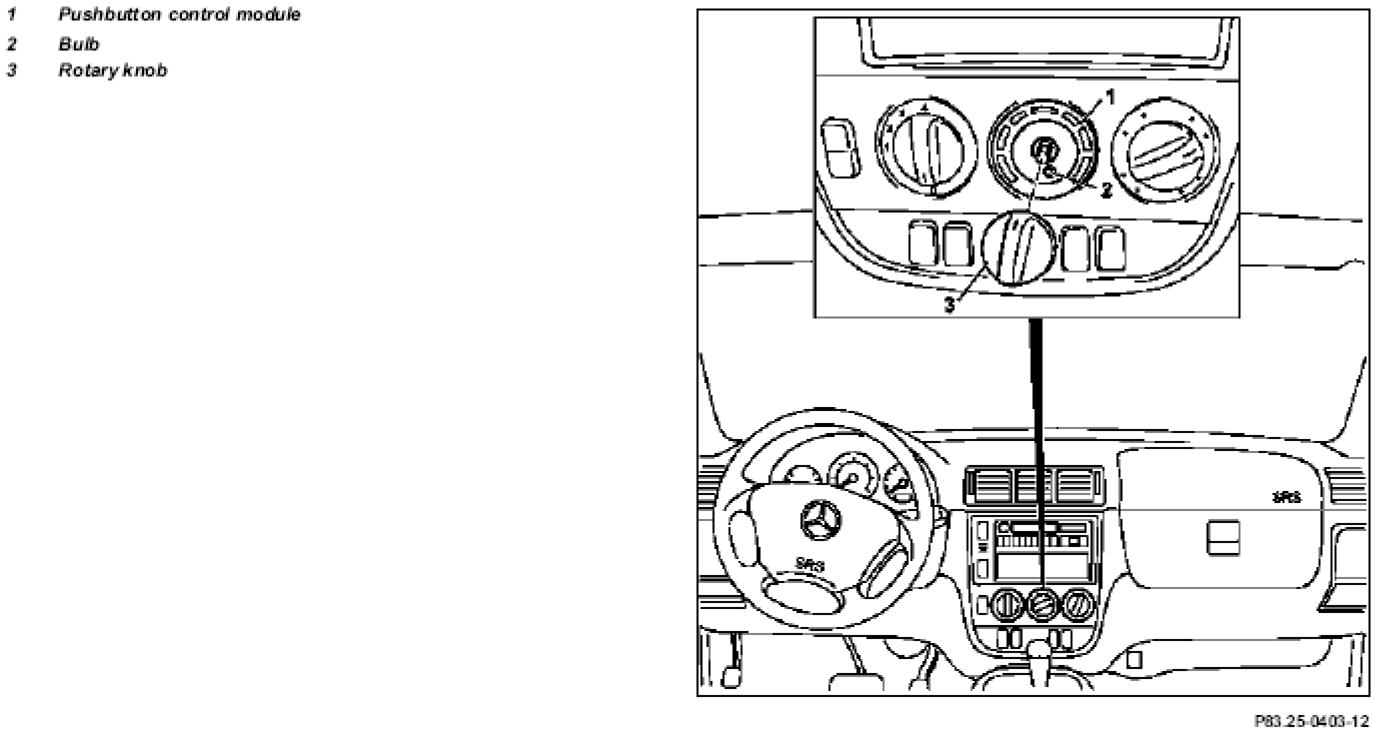


Fig. 152: Identifying Push-button Control Module Components

WF AD	**Removal, installation**		
1	Detach rotary knob (3) at push-button control module (1)	**Installation:** Rotary knob can only be pushed on the shaft in one position.	
2	Remove bulb (2)	Danger!	***WH58.30-Z-1040-02A**
3	Install in the reverse order		

Commercially available tools

Number	Designation
WH58.30-Z-1040-02A	Tweezers, straight 160 mm with rounded tips

REMOVE AND INSTALL SERIES RESISTOR FOR HEATER BLOWER - AR83.25-P-1250GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

Shown on model 163 up to VIN A289564, X754619

1	Heater housing
2	Cover below instrument panel
3	Bolts
4	Connector
R14	Blower motor preresistor group

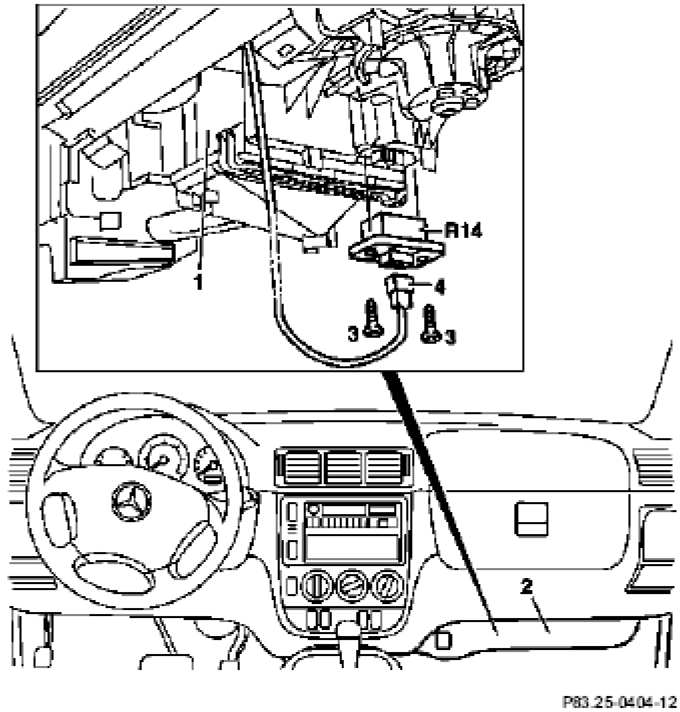


Fig. 153: Identifying Series Resistor For Heater Blower Components (Shown On Model 163 Up To VIN A289564, X754619)

WF AD	**Remove/install**		
1	Remove cover below instrument panel (2) (on right)	Up to VIN A145272, X708318. As of VINA145273, X708319.	**AR68.10-P-1520GH** **AR68.10-P-1520GI**
2	Disconnect connector (4) on blower motor series resistor group (R14)		
3	Unscrew screws (3) from blower motor series resistor group (R14) on heater housing (1)		
4	Remove blower motor series resistor group (R14)		
5	Install in the reverse order		

REMOVE/INSTALL COVER AT AIR INTAKE - AR83.25-P-1405GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

1 Windshield wiper arms
2 Rubber seal
3 Cover
4 Nuts
5 Metal clips
6 Water deflector panel

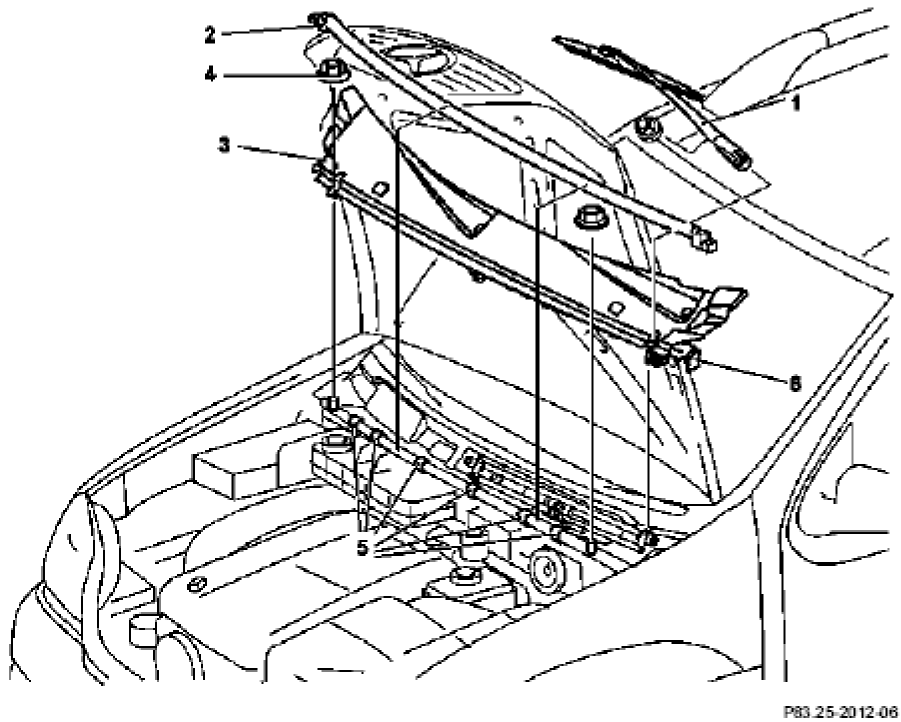


Fig. 154: Identifying Components For Cover At Air Intake - Model 163.113 /128 /136 /154 /157 /172 /174 /175

WF AD	**Remove/install**		
i	**Injury hazard** by trapping or crushing, in extreme cases with loss of limbs when reaching into windshield wiper mechanism	Always remove ignition key when working on windshield wiper mechanism.	**AS82.30-Z-0001-01A**
1	Remove wiper arms (1)		**AR82.30-P-6100GH**
2	Detach rubber seal (2) from firewall		
3	Remove metal clips (5)		
4	Unscrew nuts (4) at firewall	Remove foam insert.	
5	Seal off washer fluid hose at check valve		
6	Remove cover (3) together with water deflector panel (6)	If damaged, detach water deflector panel (6) from cover (3). **Installation:** Lubricate upper edge of cover and windshield at bottom with soapy water.	
7	Install in the reverse order		

CHECKING AIR CONDITIONING SYSTEM FOR LEAKAGE - AR83.30-D-1209-01A

Workshop equipment

WE58.40-Z-1002-20A	Air conditioning leak detector

1. Start vehicle engine and switch on air conditioning system.
2. Check entire air conditioning circuit using leak detector probe (1).

   Remain for some time in areas where leaks are suspected.

Since refrigerant is heavier than air and sinks, always guide leak detector probe (1) underneath the locations where leaks are suspected.

Line connections, screwed pipe connections, condensers and evaporators are the most frequent cause of refrigerant leaks.

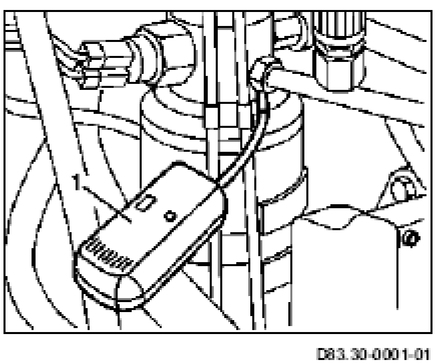


Fig. 155: Identifying Air Conditioning System Leak Detector Probe

CARRY OUT QUICK TEST ON AIR CONDITIONING SYSTEM - AR83.30-D-1209A

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

MODELS 901.0/3 /4, 902.0/3 /4, 903.0/3 /4, 904.0/3 /4 with CODE (H06) Air conditioning

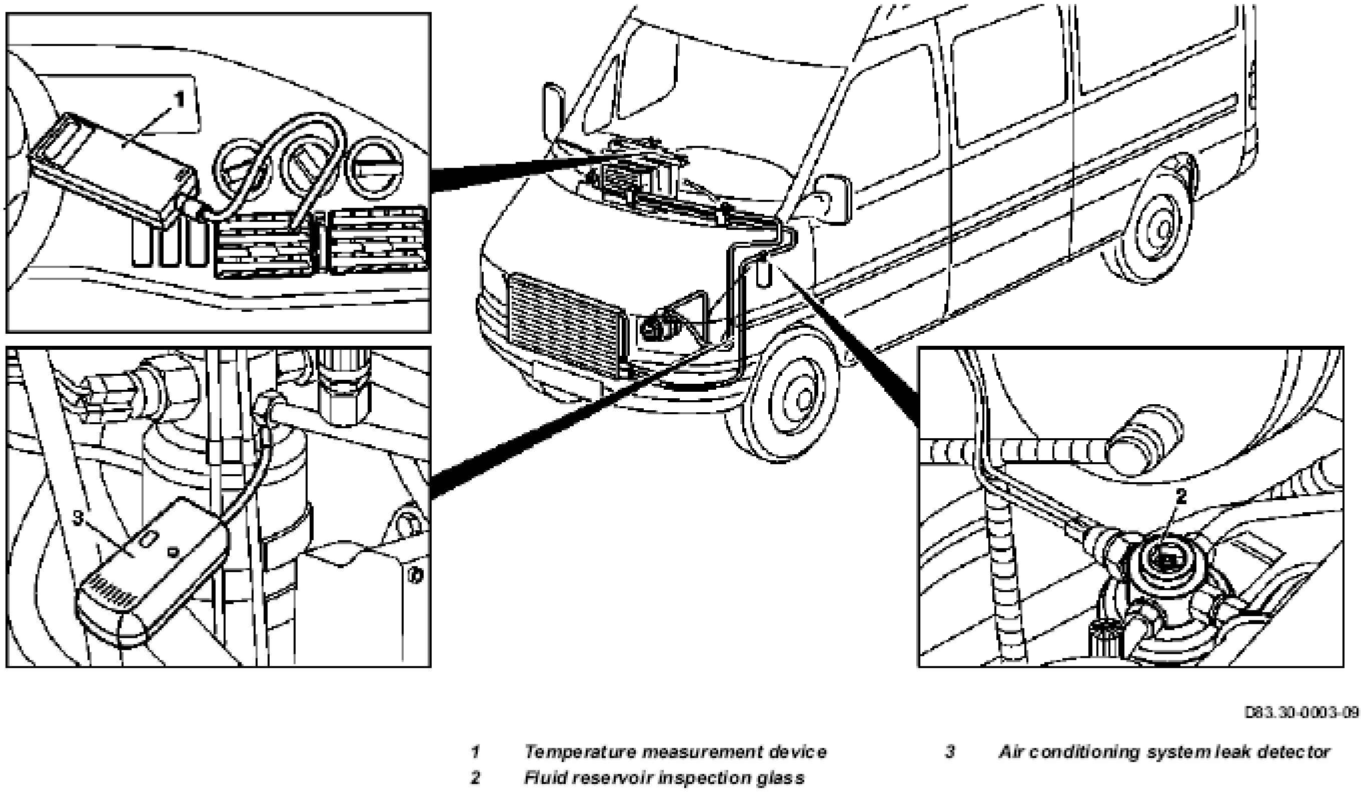


Fig. 156: Identifying Quick Test On Air Conditioning System - Shown On Models 901, 902, 903, 904

Shown on models 901, 902, 903, 904

	Prerequisites for testing		
1	Place vehicle with open windows in the shade		
2	Set heater control valve to "cold"		
3	Set heating and ventilation system to fresh air mode		
4	Fully open lateral nozzles, center nozzles and footwell flaps		
5	Start vehicle engine and allow to idle		
	Inspecting		
6	Switch air conditioning on	When the air conditioning is switched on, the vehicle engine's idle speed must increase. No idle speed increase ? Check function of refrigerant compressor RPM sensor in the event of complaint ?	

		Replace refrigerant compressor RPM sensor Models 901-904 Not in model 163	AR83.55-D-5320A
7	Set blower rotary switch to maximum blower setting		
8	Check that refrigerant flows free of bubbles	If the system is filled sufficiently, the refrigerant must flow through the inspection glass (2) free of bubbles. A newly-filled system may initially reveal bubbles. In this case, wait for approx. 10 min. and check inspection glass again. Does not reveal bubble-free flow ? Check entire air conditioning circuit for leaks using leak detector (3). Danger! Air conditioning system leak detector	**AR83.30-D-1209-01A** ***WE58.40-Z-1002-20A**
9	Determine air outlet temperature	Danger! Switch blower rotary switch to stage "1". Insert sensor of temperature measurement device (1) into the air outlet of the center nozzles. After running for a period of 5 min., the air outlet temperature must not be less than 2°C and more than 12°C. After 5 min., at the latest, the refrigerant compressor must also be connected and disconnected. If the refrigerant compressor is disconnected at below 2°C ? Check evaporator temperature switch. If the air outlet temperature is not achieved ? Check the connection and disconnection of the refrigerant compressor or the refrigerant pressure upstream and downstream of the refrigerant compressor.	***WH58.30-Z-1005-08A**
10	Switch air conditioning off and shut vehicle engine off		

Commercially available tools

Number	Designation
WH58.30-Z-1005-08A	Temperature measuring device

Workshop equipment

WE58.40-Z-1002-20A	Air conditioning leak detector

DRAINING, EVACUATING AND REFILLING AIR CONDITIONING, CHECKING FUNCTION AND CHECKING FOR LEAKS - AR83.30-P-1760GH

MODELS 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

1 Filling unit
2 Connector (red)
3 Connector (blue)



Fig. 157: Checking Draining, Evacuating And Refilling Air Conditioning Function

	Draining		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning** . Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
1	Connect the connector (blue) (3) of the filling unit (1) to the Schrader valve of the high-pressure line and the connector (red) (2) to the Schrader valve of the suction line.	During all steps, the operating instructions for the particular filling unit must be followed. Danger!	***WE58.40-Z-1002-22A**
2	Discharge air conditioning system		
3	Drain separated oil for refrigerant compressor out of the inspection glass for the filling unit and determine the quantity exactly	Drained quantity must be replaced by fresh oil for refrigerant compressor.	
	Evacuate		
	Clean air conditioning system and		

4	evacuate		
	Filling		
5	Supplement oil for refrigerant compressor	The exact quantity determined when drained must be used.	
6	Fill air conditioning system		***BF83.30-P-1001-01B**
	Testing		
7	Inspect air conditioning system for leaks with leak detector	Danger!	***WE58.40-Z-1002-20A**
i 8	**Risk of accident.** Accidents may result if the vehicle starts off unintentionally with the engine running. **Risk of injury** from bruises and burns if you hold your hand near engine when it is started or when it is running. Check function of air conditioning	Secure vehicle to prevent it from moving. Wear closed and snug-fitting work clothes. Do not grasp hot or rotating parts. Run engine at idle speed for about 4 minutes and check all the component functions which are of relevance for proper operation of the air conditioning system.	**AS00.00-Z-0005-01A**

Air conditioning system

Number	Designation			Model Series 163
BF83.30-P-1001-01B	Refrigerants	Filling quantity	g	750
		Specifications for Operating Fluids	Sheet	BB00.40-P-0361-00A

Workshop equipment

WE58.40-Z-1002-20A	Air conditioning leak detector
WE58.40-Z-1002-22A	Air conditioning service station

REMOVE/INSTALL DEFROSTER VENT FLAP ACTUATOR MOTOR FOR WINDSHIELD - AR83.30-P-2006GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

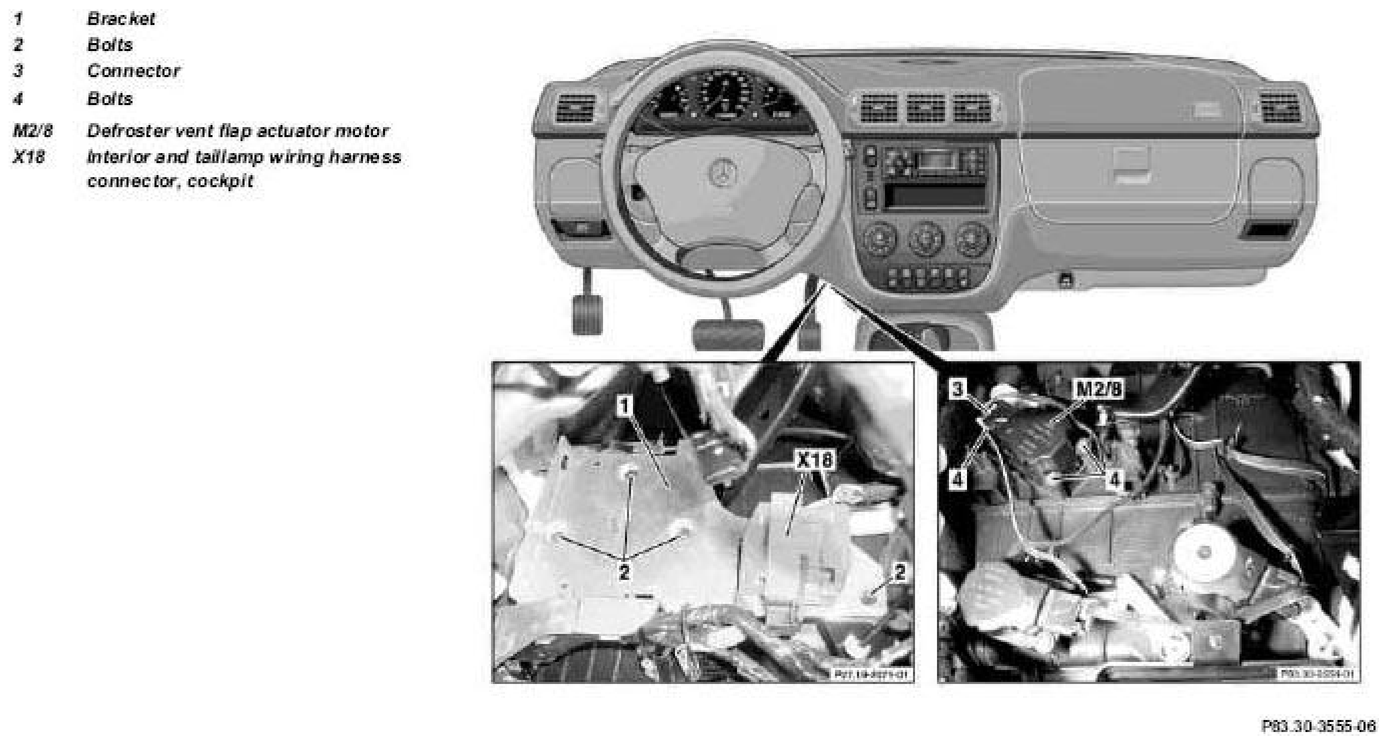


Fig. 158: Identifying Components Of Defroster Vent Flap Actuator Motor For Windshield

WF AD	**Remove/install**		
1	Remove cover below instrument panel (left)		**AR68.10-P-1500GH**
2.1	Remove electronic transmission control (ETC) control module	Only on models fitted with automatic transmission.	**AR27.19-P-1719GH**
3	Disconnect interior and taillamp wiring harness connector, cockpit (X18)from bracket(1)		
4	Remove screws (2)		
5	Move bracket (1) downwards and put to one side		
6	Disconnect plug (3)		
7	Remove screws (4) on defroster vent flap actuator motor (M2/8) from heater housing		
8	Remove defroster vent flap actuator motor (M2/8)	**Installation:** Adjust defroster vent flap actuator motor (M2/8) to the 0 position using STAR DIAGNOSIS.	
9	Install in the reverse order		

REMOVE/INSTALL FOOTWELL FLAP ACTUATOR MOTOR - AR83.30-P-2007GH

MODELS 163.113 #A as of 289565, 163.113 #X as of 754620, 163.154 /174 #A as of 289565, 163.128/157/175

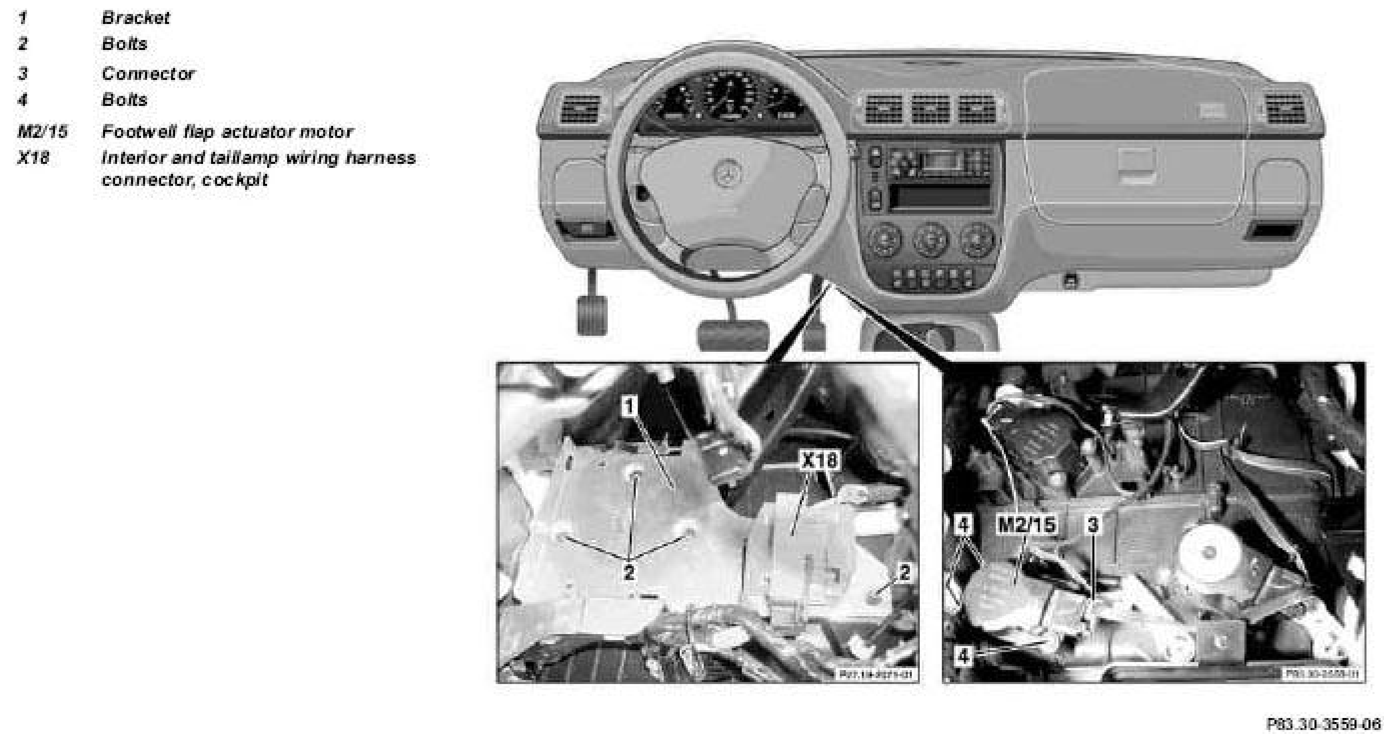


Fig. 159: Identifying Footwell Flap Actuator Motor Components

WF AD	**Remove/install**		
1	Remove cover below instrument panel (left)		**AR68.10-P-1500GH**
2.1 Remove electronic transmission control (ETC) control module		Only on models fitted with automatic transmission.	**AR27.19-P-1719GH**
3	Disconnect interior and taillamp wiring harness connector, cockpit(X18)from bracket(1)		
4	Remove screws (2)		
5	Move bracket (1) downwards and put to one side		
6	Disconnect connector (3)		
7	Remove screws (4) on defroster vent flap actuator motor (M2/15) from heater housing		
8	M2/15 Remove footwell flap	**Installation:** Adjust footwell flap actuator motor (M2/15) to the	

	actuator motor	0 position using STAR DIAGNOSIS.	
9	Install in the reverse order		

REMOVE/INSTALL REAR SHUTOFF FLAP ACTUATOR MOTOR - AR83.30-P-2008GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

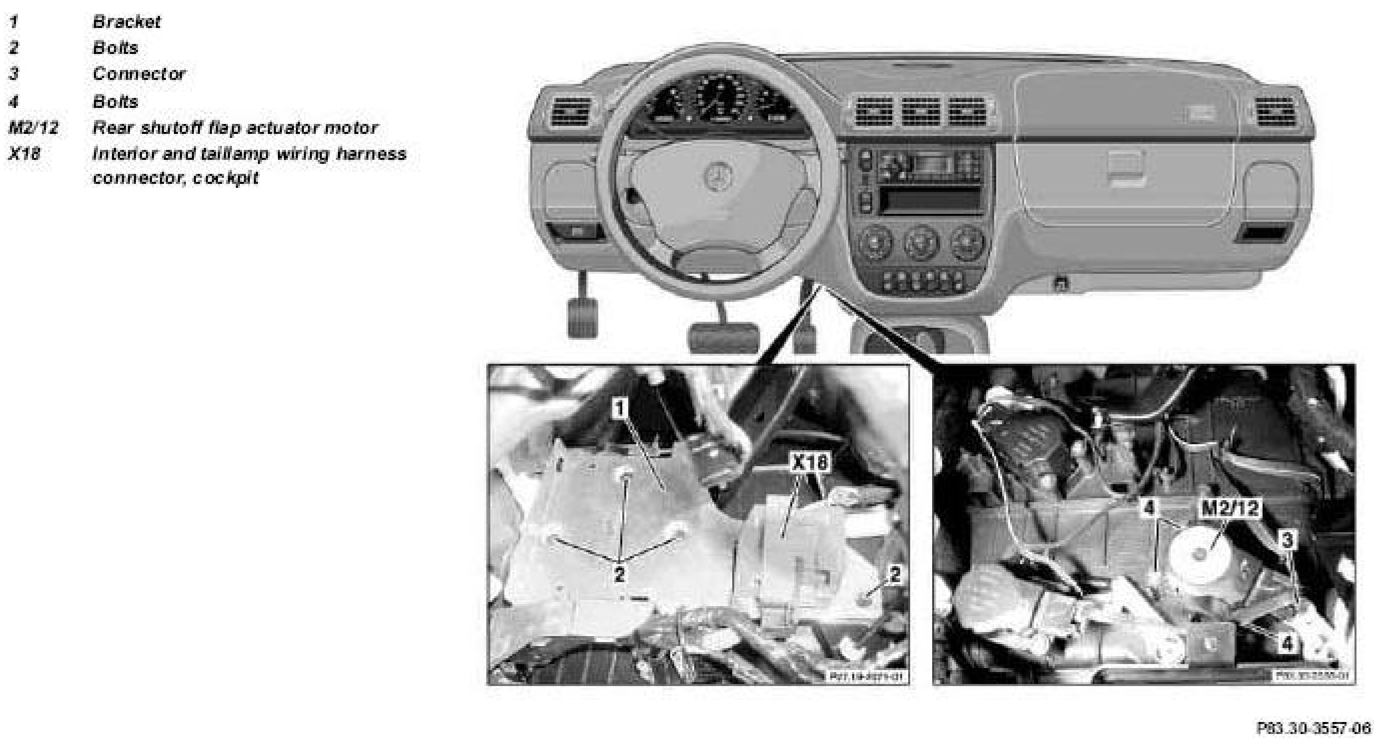


Fig. 160: Identifying Rear Shutoff Flap Actuator Motor Components

WF AD	**Remove/install**		
1	Remove cover below instrument panel (left)		**AR68.10-P-1500GH**
2.1 Remove electronic transmission control (ETC) control module		Only on models fitted with automatic transmission.	**AR27.19-P-1719GH**
3	Disconnect interior and taillamp wiring harness connector, cockpit(X18)from bracket(1)		
4	Remove screws (2)		
5	Move bracket (1) downwards and put to one side		
6	Disconnect plug (3)		
	Remove screws (4) on rear		

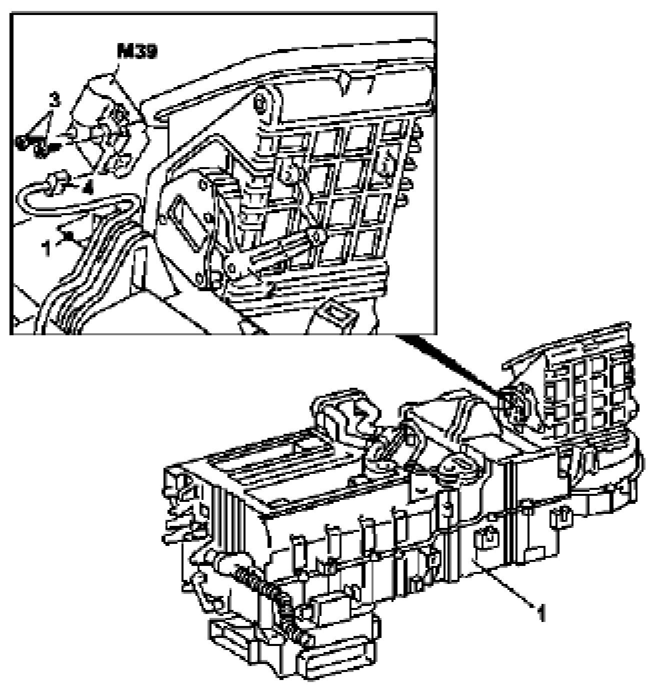
7	shutoff flap actuator motor (M2/12) from heater housing		
8	Remove rear shutoff flap actuator motor (M2/12)	**Installation:** Adjust rear shutoff flap actuator motor (M2/12)to 0 position using STAR DIAGNOSIS.	
9	Install in the reverse order		

REMOVE/INSTALL FRESH AIR/RECIRCULATED AIR STEPPER MOTOR - AR83.30-P-2010GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

Shown on model 163 up to VIN A289564, X754619

1 *A/C housing*
3 *Bolts*
4 *Connector*
M39 *Recirculated air flap actuator motor*



P83.30-0768-12

Fig. 161: Identifying Fresh Air/Recirculated Air Stepper Motor Components (Shown On Model 163 Up To VIN A289564, X754619)

WF AD	**Remove/install**		
1	Remove instrument panel		**AR68.10-P-1000GH**
2	Remove front passenger airbag unit		**AR91.60-P-0680GH**
	Disconnect connector (4) from recirculated		

3	air flap actuator motor (M39)		
4	Unscrew screws (3) from recirculated air flap actuator motor (M39)	3 screws are fitted as of VIN A289565 X754620.	
5	Detach recirculated air flap actuator motor (M39)from AC housing (1)		
6	Install in the reverse order		

REMOVING AND INSTALLING BLENDING AIR INCREMENT ADJUSTMENT MOTOR - AR83.30-P-2020GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

Shown on model 163 up to VIN A289564, X754619

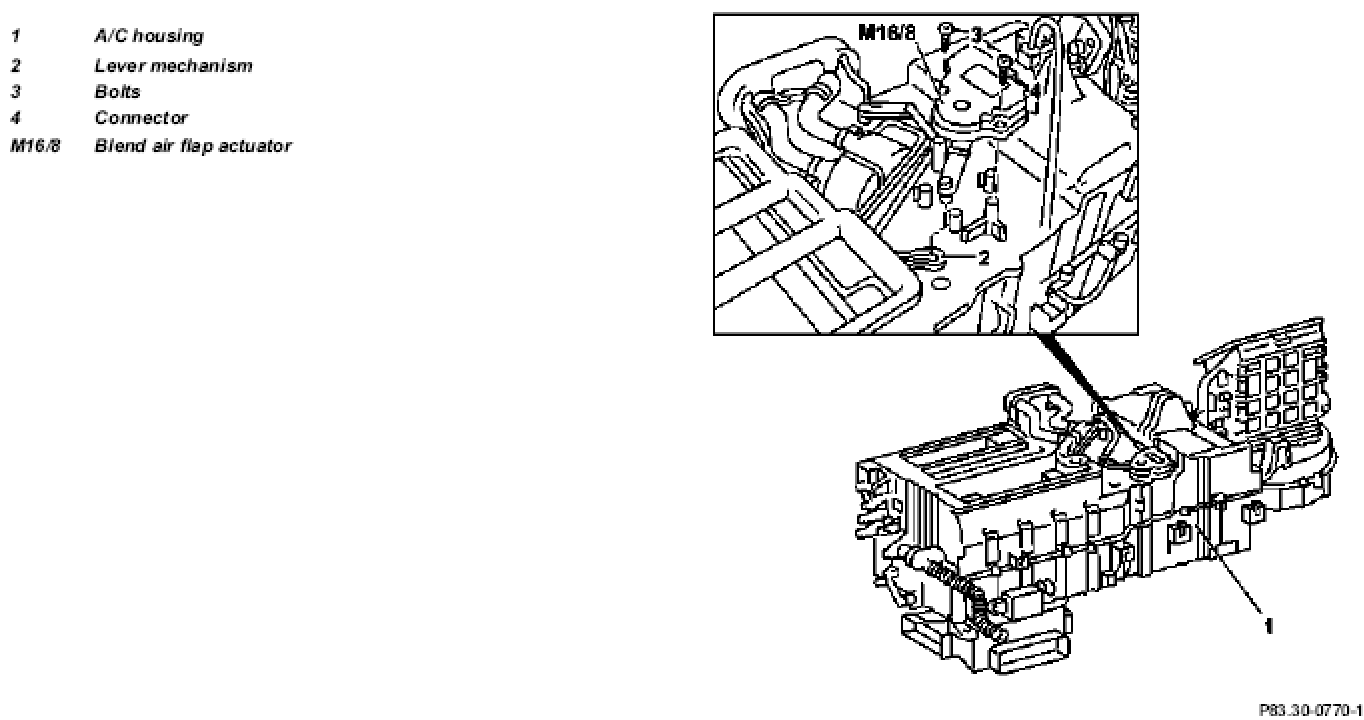


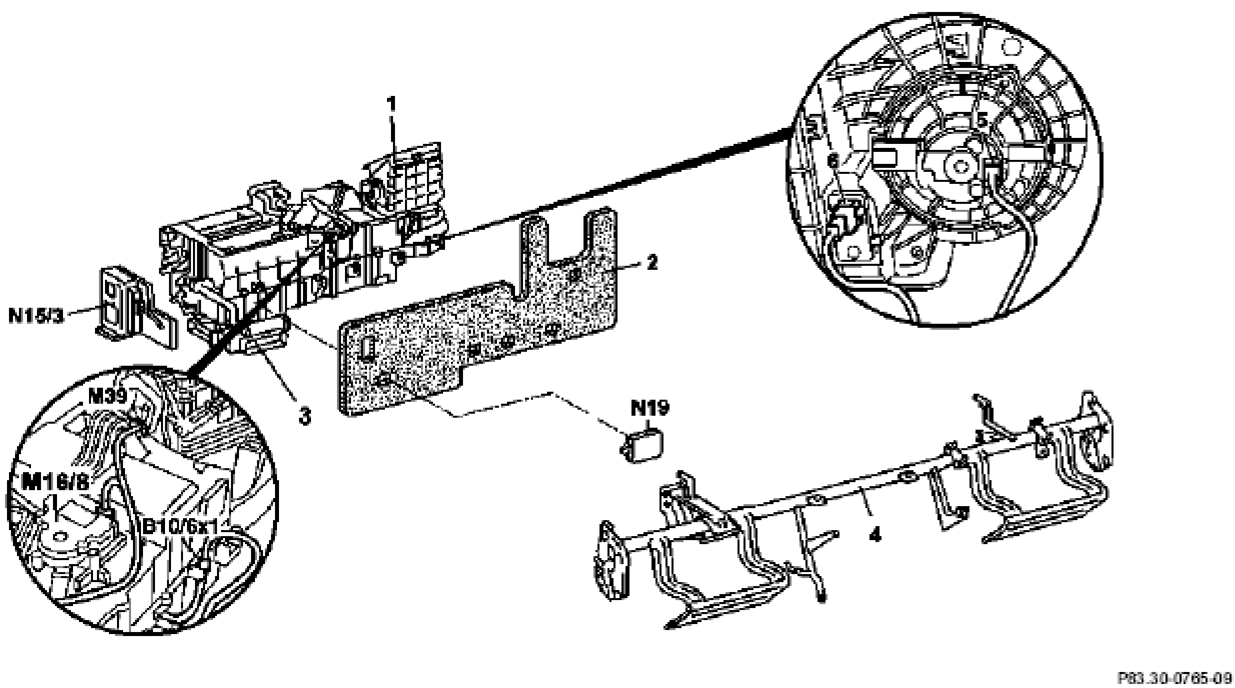
Fig. 162: Identifying Blending Air Increment Adjustment Motor Components (Shown On Model 163 Up To VIN A289564, X754619)

WF AD	**Remove/install**		
1	Remove instrument panel		**AR68.10-P-1000GH**
2	Disconnect connector (4) from blend air flap actuator (M16/8)		
3	Unscrew screws (3) from blend air flap	screws are fitted as of VIN A289565 X754620.	

	actuator (M16/8)		
4	Detach blend air flap actuator (M16/8) from AC housing (1)		
5	Install in the reverse order		

REMOVE AND INSTALL EVAPORATOR HOUSING - AR83.30-P-5200GH

MODELS 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA



1	*A/C housing*	*B10/6x1*	*Evaporator temperature sensor connector*
2	*Sound deadener*	*M16/8*	*Blending air flap actuator*
3	*Air distributor*	*M39*	*Recirculated air flap actuator motor*
4	*Instrument panel carrier*	*N15/3*	*ETC control module*
5	*Blower motor connector*	*N19*	*AAC control module*
6	*Blower motor series resistor connector*		

Fig. 163: Identifying Evaporator Housing Components (1 Of 2)

13 Refrigerant line low pressure
14 Refrigerant line high pressure
15 Expansion valve
16 Self-locking nut
17 Heat exchanger refrigerant delivery and return hoses

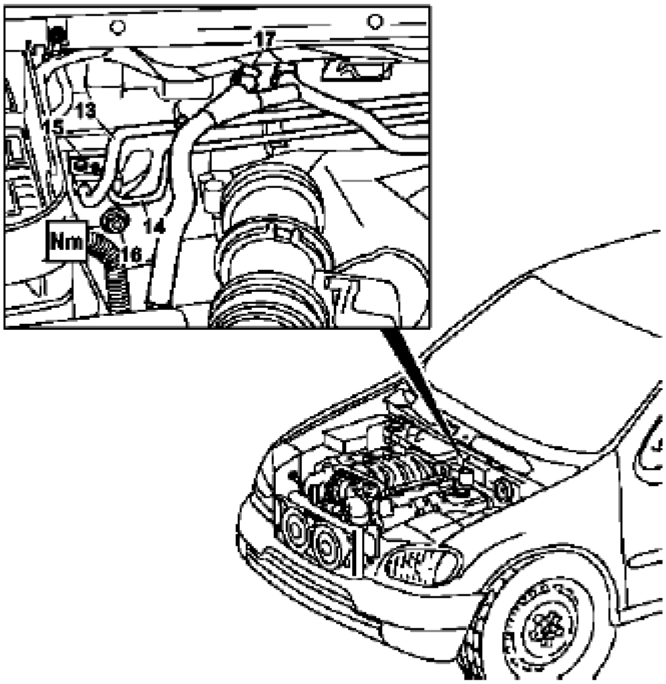


Fig. 164: Identifying Evaporator Housing Components (2 Of 2)

WF AD	**Remove/install**		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
i	**Risk of injury** to skin and eyes suffering scalding from contact with hot coolant spray. **Risk of**	Do not open cooling system unless coolant temperature is below 90°C. Open cap slowly and release the pressure. Do not pour coolant into beverage bottles.	**AS20.00-Z-0001-01A**

	poisoning from swallowing coolant.	Wear protective gloves, protective clothing and eye protection.	
1	Drain coolant	Engine 111 in MODEL 163. Engines 112 /113 in MODEL 163. Engine 628.963 in MODEL 163.128. Engine 612.963 in MODEL 163.113.	AR20.00-P-1142HG **AR20.00-P-1142HA** AR20.00-P-1142HB AR20.00-P-1142M
2.1 Detach brake line from the front end of the radiator		Only required for right-hand steering.	
3.1 Detach ignition cable from the front end of the radiator		Only required on right-hand drive vehicles with ENGINES 111 /112/113.	
4	Release coolant overflow from battery shield		
5	Disconnect upper coolant hose from the electric coolant pump	Detach hose clamp from the upper coolant hose.	
6	Unscrew nuts from expansion reservoir at firewall		
7	Remove expansion reservoir from the firewall and lay aside		
8	Disconnect coolant delivery/return hoses for heat exchanger (17)	Detach hose clamps from coolant delivery/ return hoses for heat exchanger.	
9	Discharge air conditioning system	**Installation:** Evacuate air conditioning, refill and check for proper operation and leaktightness.	**AR83.30-P-1760GH**
10	Unscrew self-locking nut (16) at the expansion valve (15)	Replace self-locking nut.	***BA83.30-P-1003-01B**
11	Detach low-pressure refrigerant line (13) and high-pressure refrigerant line (14) from expansion valve (15)	**Installation:** Install new sealing rings and moisten with compressor oil.	
12	Remove instrument panel carrier (4)		**AR68.10-P-1111GH**

13	Unclip ETC control module (N15/3)		
14	Detach connector from blend air flap actuator (M16/8)		
15	Detach connector from recirculated air flap actuator motor (M39)		
16	Detach evaporator temperature sensor connector (B10/6x1)		
17	Detach blower motor series resistor connector (6)		
18	Detach blower motor connector (5)		
19.1	Remove air conditioning control module (N19)	Only up to 31.08.01.	**AR83.30-P-6600GH**
20	Unclip cable set at evaporator housing	Installation: Ensure correct routing of cable set.	
21	Remove sound deadener (2)		
22	Detach water drain hose from AC housing lower side(1)		
23	Remove AC housing (1)	Unclip evaporator housing from air distributor and remove upward.	
24	Install in the reverse order		
25	Inspect cooling system for leaks		**AR20.00-P-1010HA**

Air conditioning system

Number	**Designation**		**Model Series 163**
BA83.30-P-1003-01B	Nut to pipeline on expansion valve	NM	10

DISASSEMBLING, ASSEMBLING A/C HOUSING - AR83.30-P-5201GH

MODEL 163 with CODE (580) Air conditioning or, in USA, Tempmatic A/C

1	Heat exchanger
2	Screws
3	Upper section of A/C housing
4	Gasket on firewall to A/C housing
5	Bottom section of A/C housing
6	Evaporator
7	Dust filter
B10/4	Evaporator temperature sensor
M2	Blower motor
M16/8	Air mixture flap actuator

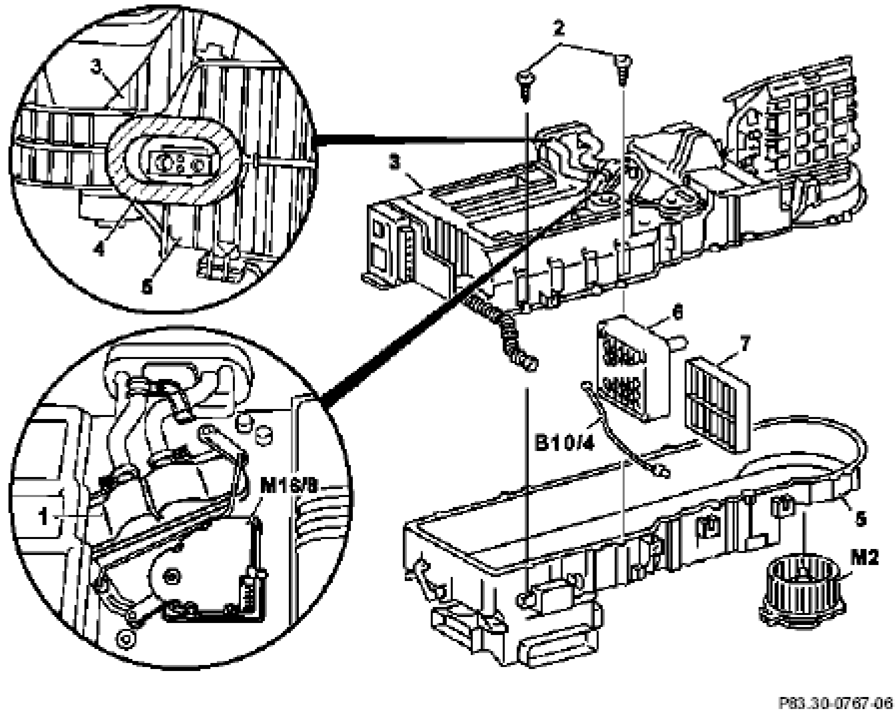


Fig. 165: Identifying A/C Housing Components

	Disassembly, assembly		
i	**Explosion hazard** due to welding or brazing work on the closed air conditioning system. **Poisoning hazard** from inhaling overheated refrigerant vapors. **Injury hazard** from eye or skin contact with liquid refrigerant.	Never perform welding or brazing work on the closed air conditioning system or in its vicinity. Smoking and open fire is prohibited. Wear protective goggles and protective gloves, only work in well ventilated rooms. Perform repair work on air conditioning circuit only if system is discharged.	AS83.00-Z-0001-01A
	Action to be taken in the event air conditioning is damaged or leaks		AH83.30-N-0004-01A
	Protect air conditioning circuit and components from moisture during repair work	All models with air conditioning	AH83.30-N-0005-01A
	Notes on handling R134a refrigerant	All models with R134a refrigerant	AH83.30-N-0003-01A
1	Remove A/C housing		AR83.30-P-5200GH
2	Remove heat exchanger (1) from heater housing		AR83.20-P-3400GH

3	Remove air mixture flap actuator (M16/8)		**AR83.30-P-2010GH**
4	Unscrew screws (2) from upper section of A/C housing (3)		
5	Remove upper section of A/C housing (3)	Replace gasket between firewall and A/C housing	
6	Remove dust filter (7) from bottom section of A/C housing (5)		
7	Remove evaporator (6)		**AR83.30-P-5540GH**
8	Remove evaporator temperature sensor (B10/4)		**AR83.30-P-8085GH**
9	Remove blower motor (M2)		**AR83.30-P-5560GH**
10	Reinstall in opposite order		

CORRECTING OIL LEVEL IN AIR CONDITIONING FOLLOWING REPAIR OR SLOW REFRIGERANT LOSS - AR83.30-P-5251E

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

A/C compressor 7SB16

MODEL 202 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor ND6CA17, A/C compressor 7SB16

MODEL 208 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor 7SB16

MODEL 210 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor 7SB16

MODELS 215,220 A/C compressor 7SE16

	Correct oil level		
	Carry out work quickly, compressor oil is hygroscopic. When evacuating refrigerant, the quantity of compressor oil evacuated must be added again to refrigerant circuit when refilling air conditioning (new oil)		

1	If loss of refrigerant is < 400 g (no leakage detectable) do not add compressor oil ? Carry out leak-tightness test	refer to SI83/85	
2	If loss of refrigerant is > 400 g (leakage detectable) fill with new compressor oil, also ? Replace fluid reservoir	 Models 202, 208, 210 Model 163 Models 215, 220	***BF83.55-P-1009-01A** AR83.30-P-6520E **AR83.30-P-6520GH** AR83.30-P-6520M

A/C compressor

Number	Designation			A/C compressor 7SB16 in models 140, 170, 202, 208, 210	A/C compressor ND6CA17 in model 202	A/C compressor 7SB16 Refrigerant R134a in model 163
BF83.55-P-1009-01A	Additional oil capacity when leakage detected	Compressor oil	cm^3	20	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A

A/C compressor

Number	Designation			A/C compressor 7SE16 in model 215	A/C compressor 7SE16 in model 220
BF83.55-P-1009-01A	Additional oil capacity when leakage detected	Compressor oil	cm^3	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A

CORRECTING OIL LEVEL IN AIR CONDITIONING AFTER REPLACING PARTS - AR83.30-P-5252E

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

A/C compressor 7SB16

MODEL 202 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor ND6CA17, A/C compressor 7SB16

MODEL 208 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air

conditioning (Automatic) A/C compressor 7SB16

MODEL 210 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor 7SB16

MODELS 215,220 A/C compressor 7SE16

	Correct oil level		
	Carry out work quickly, compressor oil is hygroscopic When evacuating refrigerant, the quantity of compressor oil evacuated must be added again to refrigerant circuit when refilling air conditioning (new oil)		
1	Replace A/C compressor, additionally fill with new compressor oil		***BF83.55-P-1008-01A**
2	Replace condenser and additionally fill with new compressor oil		***BF83.55-P-1003-01A**
3	Replace evaporator and additionally fill with compressor oil		***BF83.55-P-1004-01A**
4	Replace fluid reservoir and additionally fill with compressor oil		***BF83.55-P-1005-01A**
5	Replace suction pipe from evaporator to A/C compressor and additionally fill with new compressor oil		***BF83.55-P-1006-01A**
6	Replace pressure pipe from A/C compressor to condenser and additionally fill with new compressor oil		***BF83.55-P-1007-01A**
7	Additional oil quantity when replacing evaporator, rear air conditioning	Model 220	***BF83.55-P-1010-01A**
8	Additional oil quantity when replacing rear air conditioning lines	Model 220	***BF83.55-P-1011-01A**
9	Switch on air conditioning and allow engine to run at idle speed for approx. 4 minutes	Turn temperature thumb wheel of center nozzles to stop in blue range, or on automatic air conditioning to "Lo" Blower at max.	
10	Check function of air conditioning	Air output temperature at center nozzle must not fall below + 5^0 C, if necessary ? Carry out diagnosis	

A/C compressor

Number	**Designation**	**A/C compressor 7SB16 in**	**A/C compressor 7SB16**	**A/C compressor ND6CA17 in**

				models 140, 170, 202, 208, 210	Refrigerant R134a in model 163	model 202
BF83.55-P-1003-01A	Additional oil quantity when replacing condenser	Compressor oil	cm^3	20	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1004-01A	Additional oil quantity when replacing evaporator	Compressor oil	cm^3	40	40	40
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1005-01A	Additional oil quantity when replacing fluid reservoir	Compressor oil	cm^3	10	10	10
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1006-01A	Additional oil quantity when replacing suction line	Compressor oil	cm^3	20	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1007-01A	Additional oil quantity when replacing pressure line	Compressor oil	cm^3	20	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1008-01A	Additional oil quantity when replacing A/C compressor	Compressor oil	cm^3	20	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1010-01A	Additional oil quantity when replacing evaporator, rear air conditioning	Compressor oil	cm^3	-	-	-
		Specifications for service products	Sheet	-	-	-
BF83.55-P-1011-01A	Additional oil quantity when replacing rear air conditioning lines	Compressor oil	cm^3	-	-	-
		Specifications for service products	Sheet	-	-	-

A/C compressor

Number	Designation	A/C compressor 7SE16 in model	A/C compressor 7SE16 in model

				215	220
BF83.55-P-1003-01A	Additional oil quantity when replacing condenser	Compressor oil	cm^3	3	3
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1004-01A	Additional oil capacity when replacing evaporator	Compressor oil	cm^3	40	40
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1005-01A	Additional oil quantity when replacing fluid reservoir	Compressor oil	cm^3	10	10
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1006-01A	Additional oil quantity when replacing suction line	Compressor oil	cm^3	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1007-01A	Additional oil quantity when replacing pressure line	Compressor oil	cm^3	10	10
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1008-01A	Additional oil quantity when replacing A/C compressor	Compressor oil	cm^3	20	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1010-01A	Additional oil quantity when replacing evaporator, rear air conditioning	Compressor oil	cm^3	-	3
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A
BF83.55-P-1011-01A	Additional oil quantity when replacing rear air conditioning lines	Compressor oil	cm^3	-	20
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A

CORRECTING OIL LEVEL IN AIR CONDITIONING AFTER SYSTEM SUDDENLY LOSES ALL REFRIGERANT - AR83.30-P-5253E

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA A/C compressor 7SB16

MODEL 202 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor ND6CA17, A/C compressor 7SB16

MODEL 208 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor 7SB16

MODEL 210 with CODE (580) Air conditioning or Tempmatic for USA with CODE (581a) Air conditioning (Automatic) A/C compressor 7SB16

MODELS 215,220 A/C compressor 7SE16

	Correct oil level		

	Carry out work quickly, compressor oil is hygroscopic When evacuating refrigerant, the quantity of compressor oil evacuated must be added again to refrigerant circuit when refilling air conditioning (new oil)		
1	Replace defective component and fluid reservoir	Models 202, 208, 210 Model 163 Model 215, 220	AR83.30-P-6520E **AR83.30-P-6520GH** AR83.30-P-6520M
2	Additionally fill new compressor oil to specified oil capacity		***BF83.55-P-1002-01A**

A/C compressor

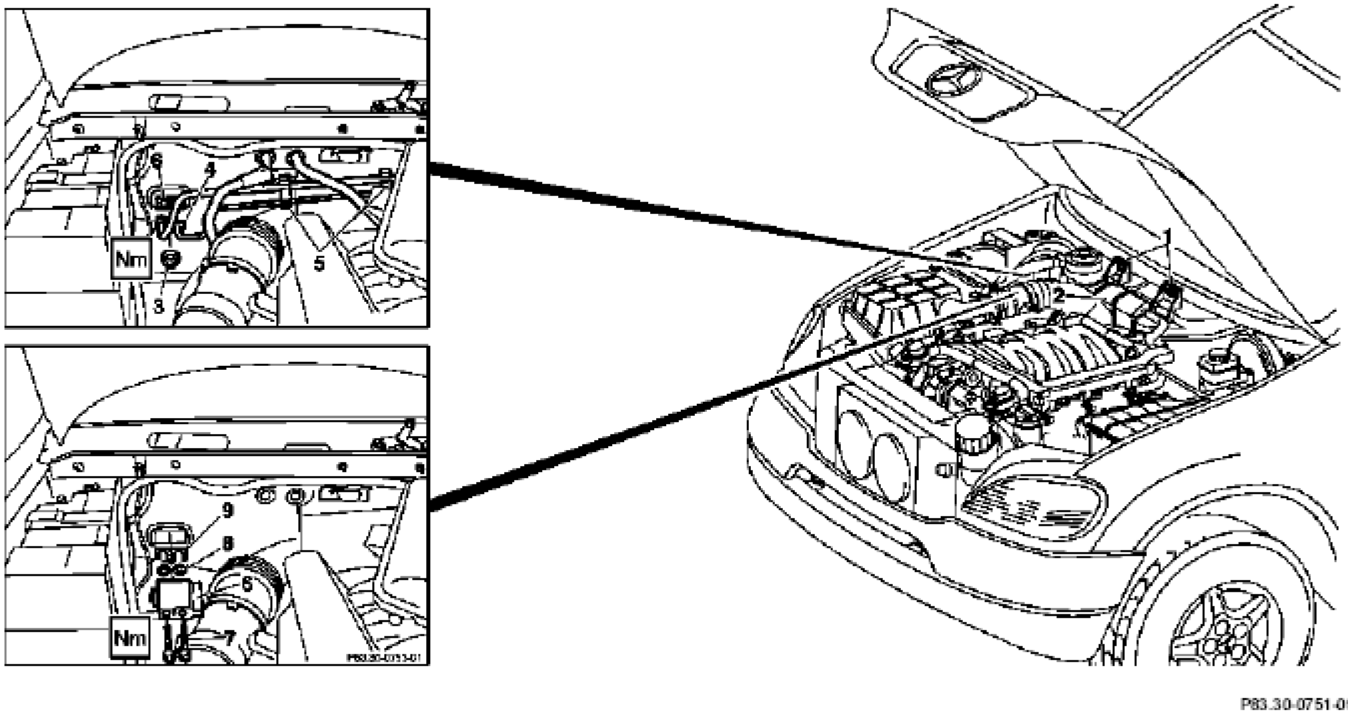
Number	Designation			A/C compressor 7SB16 Refrigerant R134a in model 163	A/C compressor 7SB16 in models 140, 170,202,208, 210	A/C compressor ND6CA17 in model 202
F83.55-P-1002-01A	Additional oil capacity after sudden emptying of system (e.g. ruptured line)	Compressor oil	cm^3	40	40	40
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A	BB00.40-P-0362-00A

A/C compressor

Number	Designation			A/C compressor 7SE16 in model 215	A/C compressor 7SE16 in model 220
BF83.55-P-1002-01A	Additional oil capacity after sudden emptying of system (e.g. ruptured line)	Compressor oil	cm^3	50	50
		Specifications for service products	Sheet	BB00.40-P-0362-00A	BB00.40-P-0362-00A

REMOVE AND INSTALL EXPANSION VALVE - AR83.30-P-5520GH

MODELS 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA



1	Expansion reservoir nut	4	Pipe bracket	7	Bolts
2	Expansion reservoir	5	Pipe attachment clamps	8	Seals
3	Self-locking nut	6	Expansion valve	9	Bracket for expansion valve to evaporator

Fig. 166: Identifying Expansion Valve Components

	WF AD	**Remove/Install**	
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Discharge air conditioning system	**Installation:** Evacuate air conditioning, refill and check for proper operation and leaktightness.	**AR83.30-P-1760GH**
2	Unscrew expansion reservoir nuts (1)	Lay compensating reservoir to one side.	

3	Detach piping bracket (4) from expansion valve (6)	**Installation:** Install new self-locking nut (3).	***BA83.30-P-1003-01B**
4	Detach piping fastening clamps (5) from firewall		
5	Pull both pipes out of the expansion valve (6)	Press pipes to the side.	
6	Unscrew bolts (7) from expansion valve (6)		***BA83.30-P-1004-01B**
7	Remove expansion valve (6)	**Installation:** Install new sealing rings and moisten with compressor oil.	
8	Install in the reverse order		

Air conditioning system

Number	Designation		Model Series 163
BA83.30-P-1003-01B	Nut to pipeline on expansion valve	NM	10
BA83.30-P-1004-01B	Bolt, expansion valve to evaporator core	NM	10

REMOVE/INSTALL EVAPORATOR - AR83.30-P-5540GH

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

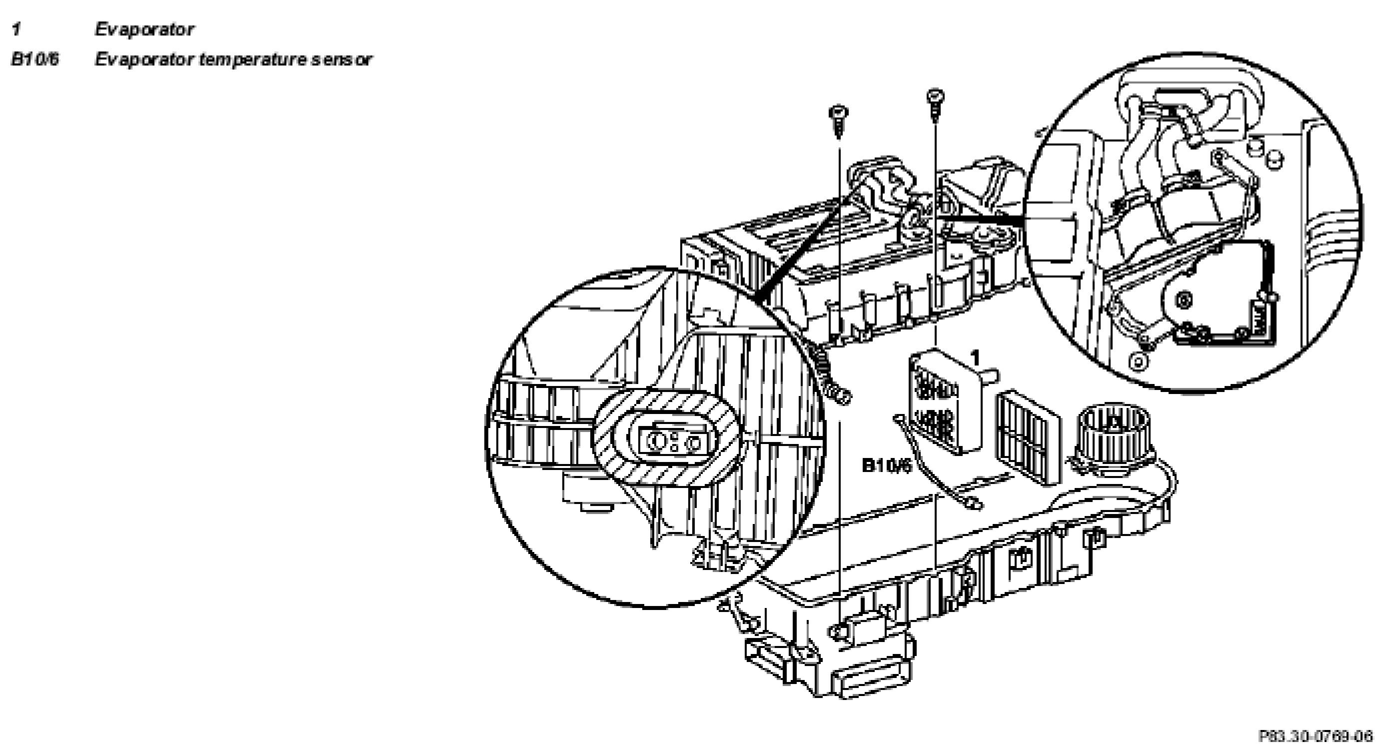


Fig. 167: Identifying Evaporator Temperature Sensor Components

WF AD	Remove/Install		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning** . Inhaling overheated refrigerant vapors may be toxic. **Risk of injury.** Contact with liquid refrigerant may result in injury to the skin and eyes.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Remove evaporator housing		**AR83.30-P-5200GH**
2	Remove expansion valve	**Installation:** Replace sealing rings between the expansion valve and evaporator and moisten with compressor oil.	**AR83.30-P-5520GH**
3	Disassemble AC housing		**AR83.30-P-5201GH**
4	Remove evaporator (1) from AC housing	Observe oil filling capacity when replacing the evaporator.	***BF83.55-P-1004-01A**
5	Remove evaporator temperature sensor (B10/6)		**AR83.30-P-8085GH**
6	Install in the reverse order		

Refrigerant compressor

Number	Designation			Refrigerant compressor 7SB16, refrigerant R134a in model 163
BF83.55-P-1004-01A	Additional oil filling capacity when replacing evaporator	Compressor oil	cm^3	40
		Specifications for Service Products	Sheet	BB00.40-P-0362-00A

REMOVE/INSTALL AIR CONDITIONING BLOWER MOTOR - AR83.30-P-5560GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

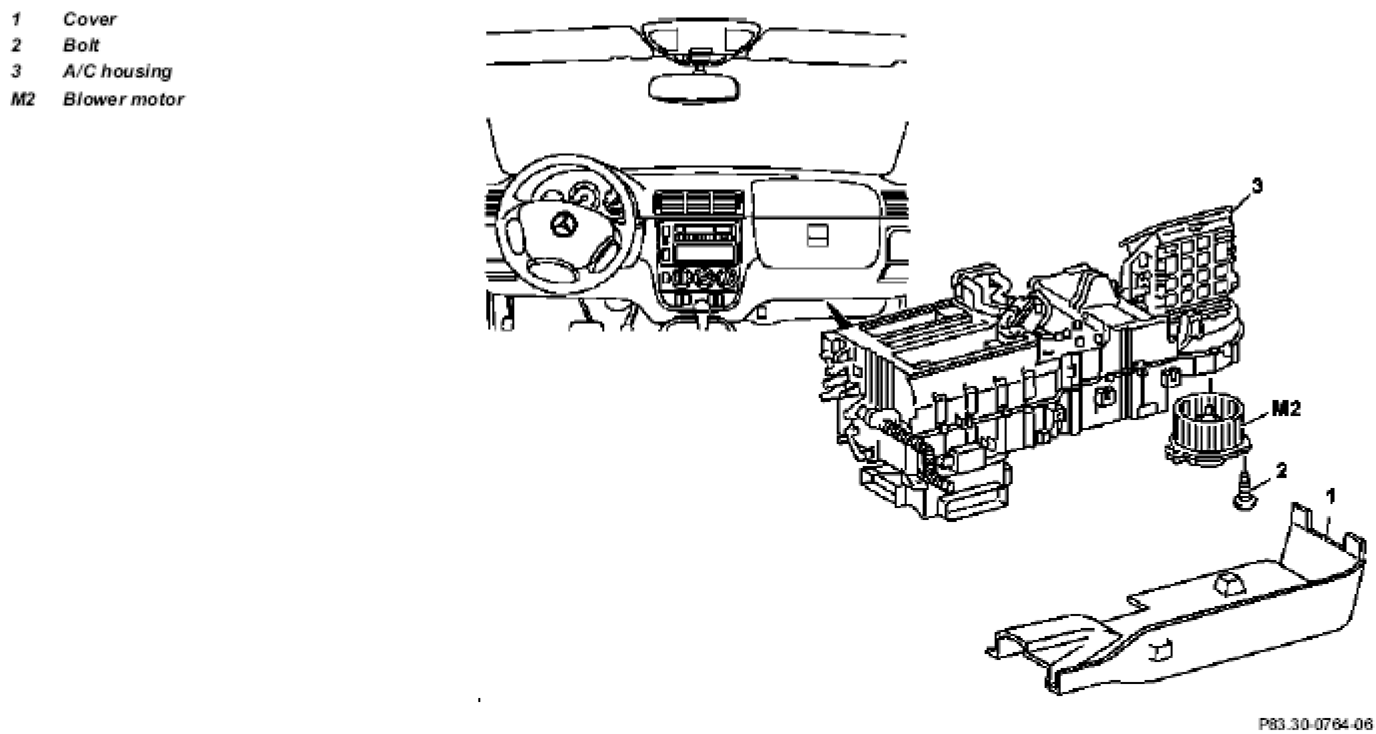


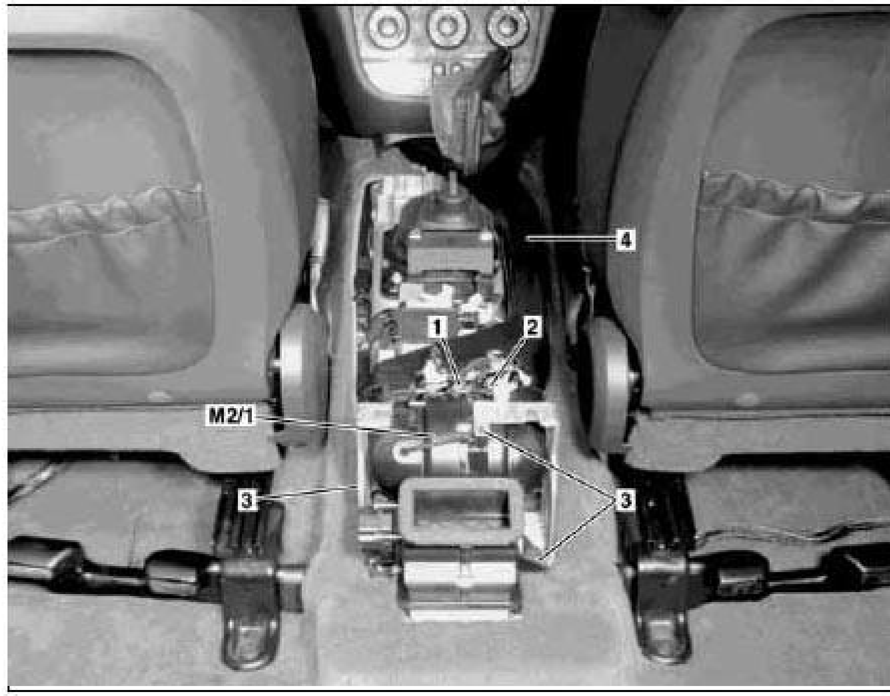
Fig. 168: Identifying Air Conditioning Blower Motor Components

WF AD	**Remove/Install**		
1	Remove cover (1) under the instrument panel (right)	Up to VIN A145272, X708318. As of VIN A145273, X708319.	**AR68.10-P-1520GH** **AR68.10-P-1520GI**
2	Unscrew bolt (2) from blower motor (M2)		
3	Disconnect connector from blower motor (M2)		
4	Remove blower motor (M2) from AC housing (3)		
5	Install in the reverse order		

REMOVE/INSTALL BLOWER MOTOR IN REAR - AR83.30-P-5565GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

1	*Rear blower motor connector*
2	*Rear blower motor connector*
3	*Bolts*
4	*Air duct*
M2/1	*Rear blower motor*



P83.50-2053-06

Fig. 169: Identifying Rear Blower Motor Components

WF AD	**Remove/install**		
1	Remove center console		**AR68.20-P-2000GH**
2	Disconnect rear blower motor connector (1, 2)		
3	Remove screws (3)		
4	Pull out rear blower motor (M2/1) to the rear	**Installation:** Ensure that the rear blower motor (M2/1) is connected to the air duct correctly (4).	
5	Install in the reverse order		

REMOVE/INSTALL AUXILIARY FAN - AR83.30-P-5600GH

MODEL 163.136 /154 /157 /172 with CODE (580) Air conditioning or Tempmatic for USA

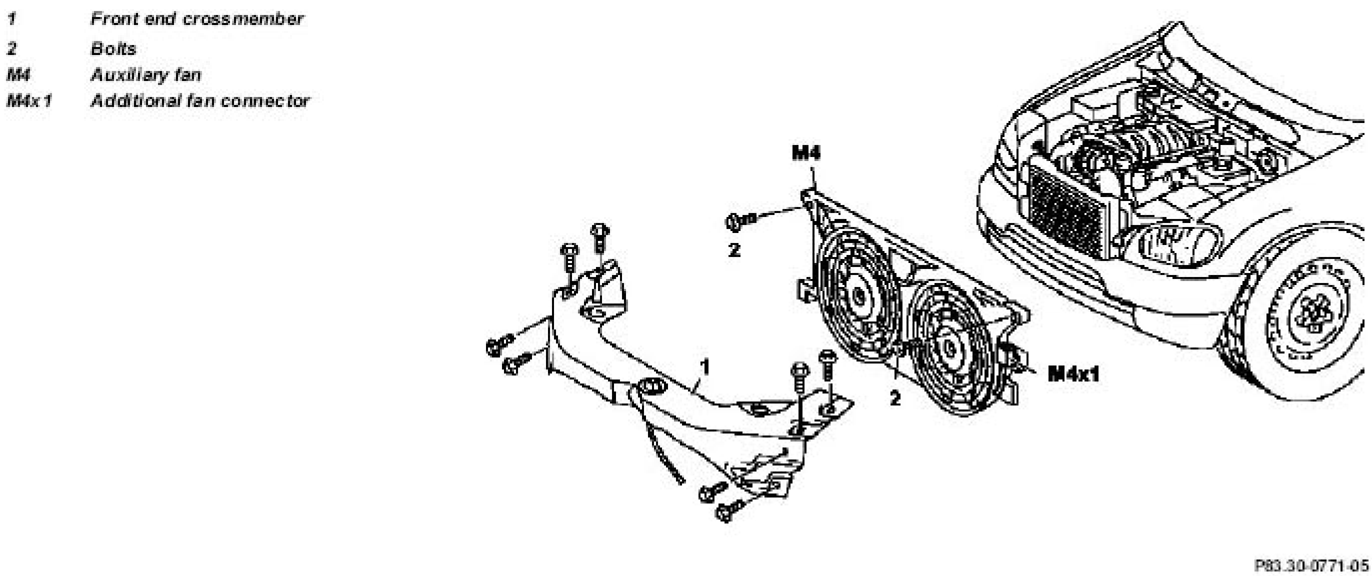


Fig. 170: Identifying Auxiliary Fan Components

WF AD	**Remove/install**		
1	Remove upper frame cross member (1)		AR62.30-P-2300GH
2	Unscrew bolts (2) for auxiliary fan (M4) at radiator		
3	Disconnect additional fan connector (M4x1)		
4	Unclip electric cable for outside temperature sensor at auxiliary fan (M4)		
5	Pull out auxiliary fan (M4) upward	**Installation:** Insert additional fan in the lower guides first pay attention to correct seating.	
6	Install in the reverse order		

REMOVE AND INSTALL RECEIVER/DRIER - AR83.30-P-6520GH

MODELS 163.113/136/ /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

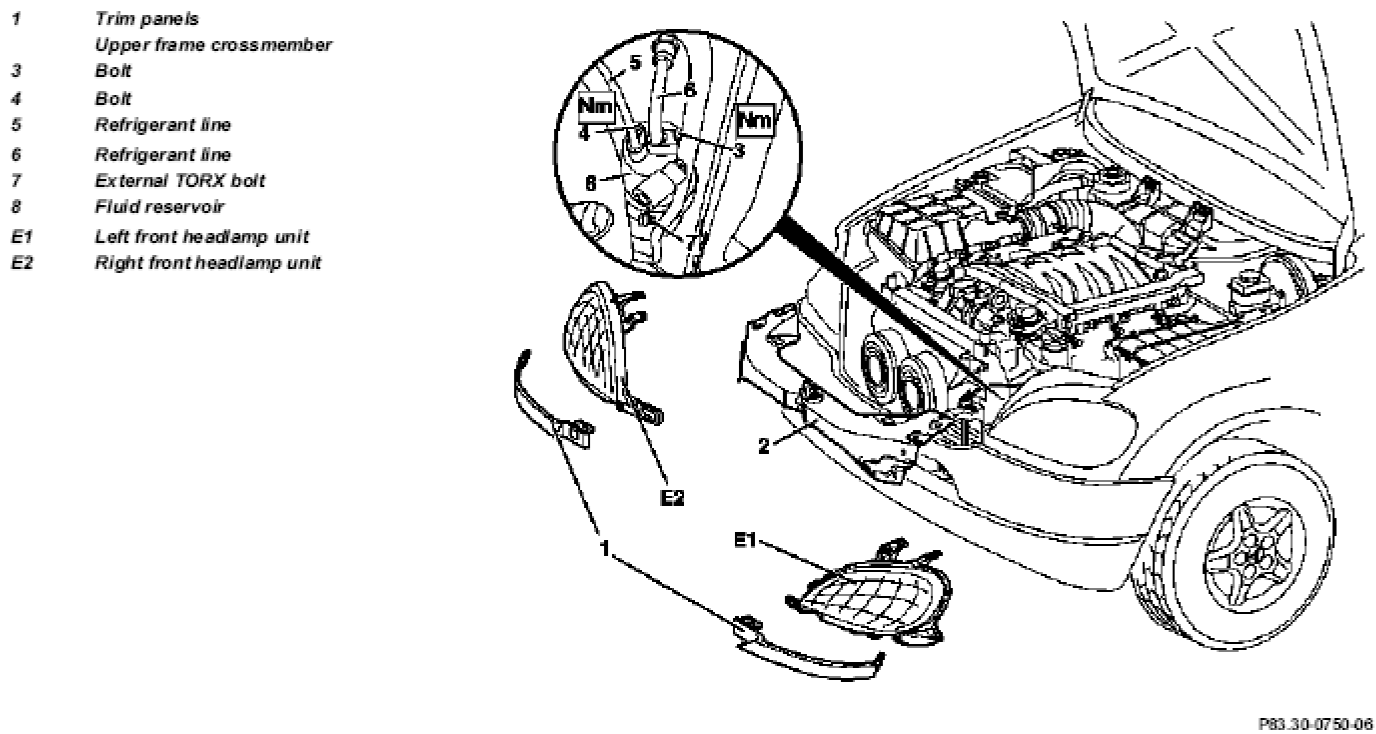


Fig. 171: Identifying Receiver/Drier Components

WF AD	**Remove/install**		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Remove upper frame cross member		**AR62.30-P-2300GH**
2.1	Remove charge air cooler	On Model 163.113 only.	AR09.41-P-6817MM

3.1	Remove mass air flow sensor on left behind the charge air cooler	On Model 163.113 only: between the air hose of the charge air cooler and engine.	
4	Discharge air conditioning system	**Installation:** Evacuate air conditioning, refill and check for proper operation and leaktightness.	**AR83.30-P-1760GH**
5	Unscrew screw (3) for refrigerant line (6) to the expansion valve and screw (4) for refrigerant line (5) from the condenser at the fluid reservoir (8)		***BA83.30-P-1001-01B**
6	Remove refrigerant line (5) from condenser and refrigerant line (6) to the expansion valve at the fluid reservoir (8)	**Installation:** Install new sealing rings and moisten with compressor oil.	
7	Release external Torx drive bolt (7) at fluid reservoir clamp	External torx set	**Fig. 172**
8	Remove fluid reservoir (8)	**Installation:** Note additional oil filling capacity when replacing the fluid reservoir.	***BF83.55-P-1005-01A**
9	Install in the reverse order		

Air conditioning system

Number	Designation		Model Series 163
BA83.30-P-1001-01B	Hexagon bolt securing refrigerant line to fluid reservoir	NM	10

Refrigerant compressor

Number	Designation			Refrigerant compressor 7SB16, refrigerant R134a in model 163
BF83.55-P-1005-01A	Additional oil filling capacity when replacing fluid reservoir	Compressor oil	cm^3	10
		Specifications for Operating Fluids	Sheet	BB00.40-P-0362-00A

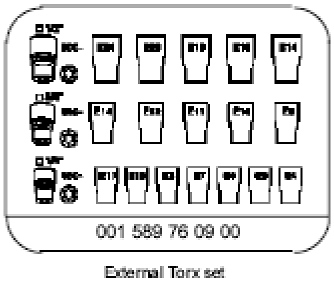


Fig. 172: Identifying External Torx Set (001 589 76 09 00)

INSTALL/REMOVE CONDENSER - AR83.30-P-6540GH

MODELS 163.113 /128 /136 /154 /157 /172 /174 /175 with CODE (580) Air conditioning or Tempmatic for USA

Illustrated on model 163.154

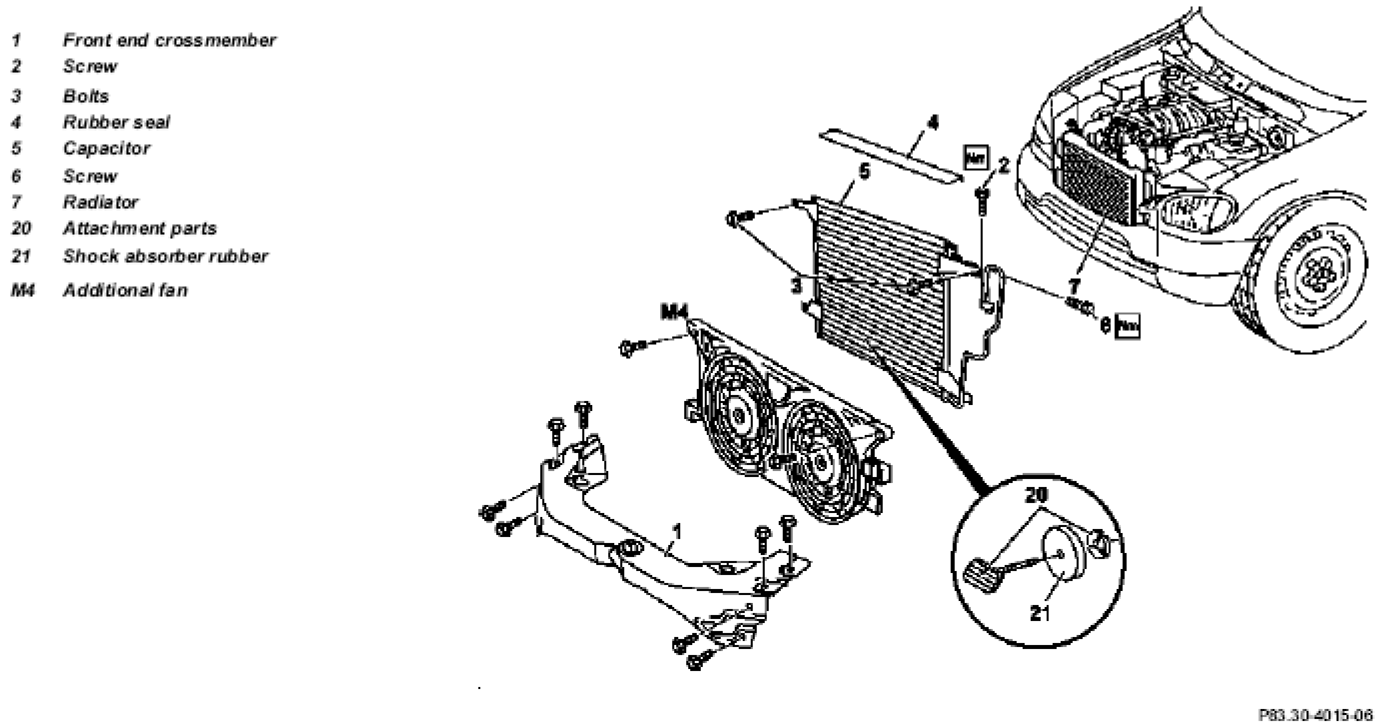


Fig. 173: Identifying Condenser Components

WF AD	**Remove/Install**		
i	**Risk of explosion** caused by welding or soldering work on closed air conditioning system. **Risk of poisoning** caused by inhaling overheated refrigerant vapors. **Risk of injury** to skin and eyes caused by contact with liquid refrigerant.	Never perform welding work on or near a closed air conditioning system. No smoking or open flames. Wear safety glasses and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Conduct if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**

	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1.1 Remove additional fan (M4)		Models 163.136 /154/157 /172 with air conditioning or for USA Tempmatic, code 580.	**AR83.30-P-5600GH**
2.1	Remove intercooler	Only models 163.113/ 128. Model 163.113 Model 163.128	 AR09.41-P-6817MM AR09.41-P-6817CD
3	Discharge air conditioning system	**Installation:** Evacuate, refill air conditioning system and check for proper operation and tightness.	**AR83.30-P-1760GH**
4.1	Detach lower engine compartment paneling	Model 163.172/174/175	**AR61.20-P-1105GH**
4.2	Remove noise encapsulation	**Removal:** Only remove front part. Model 163.113/128	 AR94.30-P-5400GH
5.1	Remove air guide	Only if present Located at front crossmember, in center behind front bumper.	
6	Unscrew bolts at bottom of electric fan or fan shroud.	Also remove sheet metal nuts.	
7	Remove attachment parts (20) and rubber shock absorber(21)	**Removal:** Lower attaching parts and damper rubber. **Installation:** Replace attaching parts.	
8	Unscrew screw (2) for refrigerant line at fluid reservoir		***BA83.30-P-1001-01B**
9	Detach refrigerant line from fluid reservoir	**Installation:** Replace sealing rings and moisten with compressor oil.	
10	Unscrew screw (6) for refrigerant line at condenser(5)		***BA83.30-P-1002-01B**
11	Detach refrigerant line from condenser (5)	**Installation:** Replace sealing rings and moisten with compressor oil.	
12	Detach rubber seal (4) from radiator (7)		
13	Remove screws (3)		
14.1	Remove attachment parts (20) and rubber shock absorber(21)	Model 163.113/128 Upper attaching parts and damper rubber. **Installation:** Replace attaching parts.	

15	Remove capacitor (5) upward	**Installation:** Note additional oil filling capacity when replacing the condenser.	***BF83.55-P-1003-01A**
16	Install in the reverse order		

Air conditioning system

Number	**Designation**		**Model 163**
BA83.30-P-1001-01B	Hexagon bolt securing refrigerant line to fluid reservoir	Nm	10
BA83.30-P-1002-01B	Hexagon bolt for refrigerant line to capacitor	Nm	20

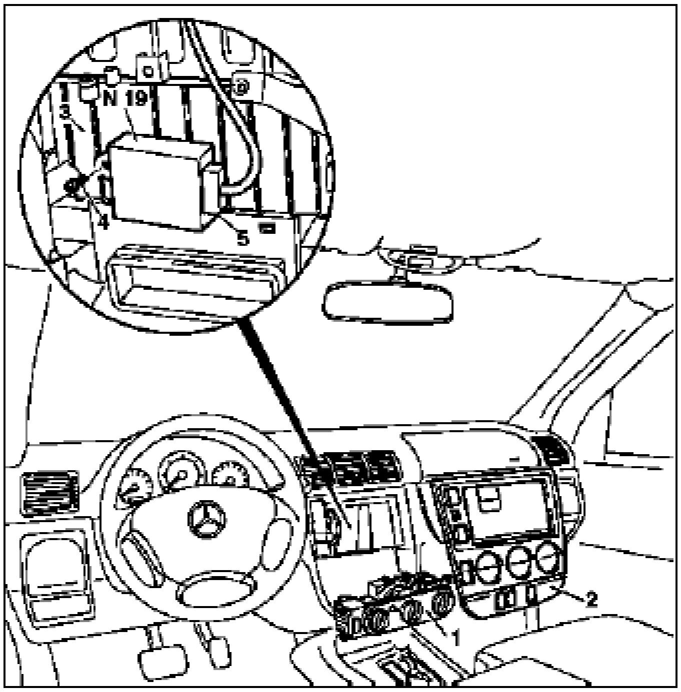
Refrigerant compressor

Number	**Designation**			**Refrigerant compressor 7SB16, refrigerant R134a in model 163**
BF83.55-P-1003-01A	Additional oil filling capacity when replacing condenser	Compressor oil	cm^3	20
		Specifications for Operating Fluids	Sheet	BB00.40-P-0362-00A

REMOVE, INSTALL AIR CONDITIONING CONTROL MODULE - AR83.30-P-6600GH

MODELS 163.113/136/154/172/174 up to 31.8.01 with CODE (580) air conditioning or Tempmatic for USA

1	Switch unit for heater/ventilation
2	Center part of instrument panel
3	Evaporator housing
4	Bolt
5	Connector
N19	Air conditioning control module



P83.30-0752-12

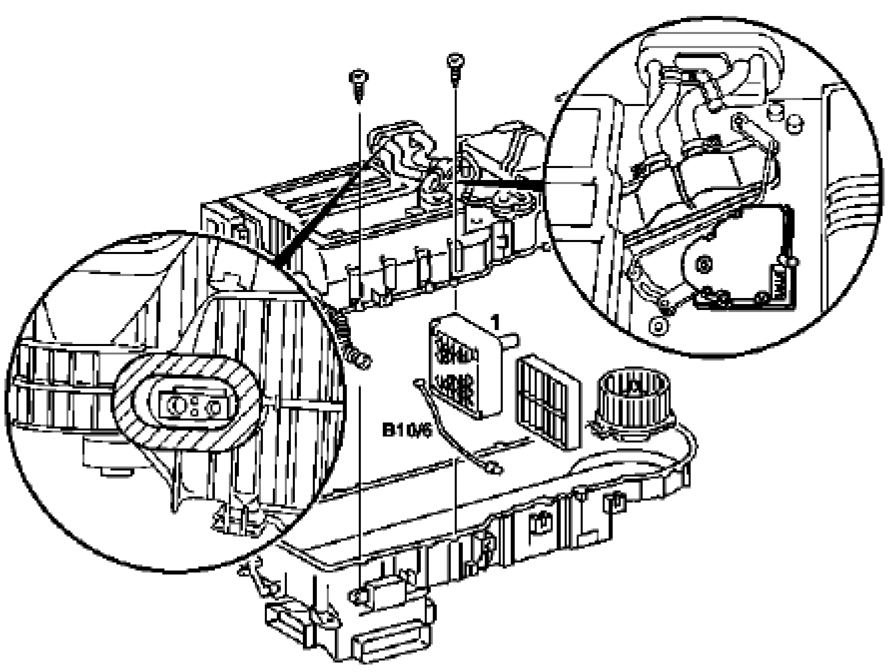
Fig. 174: Identifying Air Conditioning Control Module Components

WF AD	**Removal, installation**		
1	Disconnect ground cable of battery		**AR54.10-P-0003A**
2	Remove switch unit for heater/ ventilation (1)		**AR83.20-P-1835GH**
3	Unscrew bolt (4) for air conditioning control module (N19) at evaporator housing (3)		
4	Disconnect connector (5) at air conditioning control module (N19)		
5	Detach air conditioning control module (N19) from evaporator housing (3)		
6	Install in the reverse order		
7	Encode radio		**AR82.60-P-7502-01GH**
8	Read out diagnostic trouble code memory, erase and set clock		

REMOVE AND INSTALL EVAPORATOR TEMPERATURE SENSOR - AR83.30-P-8085GH

MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

1 Evaporator
B10/6 Evaporator temperature sensor



P83.30-0769-06

Fig. 175: Identifying Evaporator Temperature Sensor Components

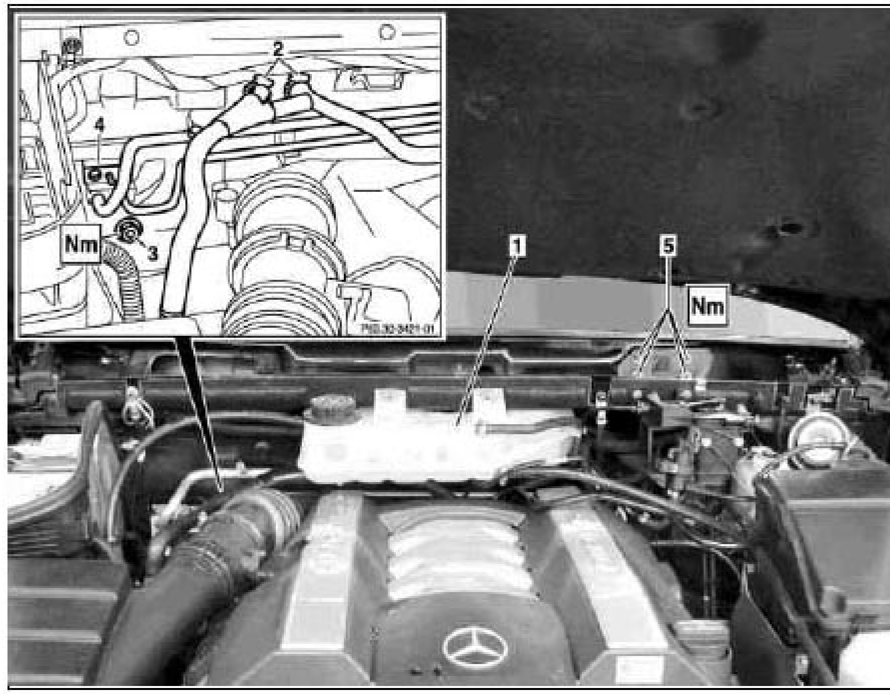
WF			

AD	**Remove/Install**		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury.** Contact with liquid refrigerant may result in injury to the skin and eyes.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Remove evaporator housing		**AR83.30-P-5200GH**
2	Disassemble AC housing		**AR83.30-P-5201GH**
3	Unclip evaporator temperature sensor (B10/6) from evaporator (1)		
4	Install in the reverse order		

REMOVE/INSTALL OUTSIDE AIR TEMPERATURE SENSOR - AR83.30-P-8086GH

MODELS 163.113 #A up to 289564, 163.154 #A as of 145272 up to 289564, 163.172 #A as of 145272, 163.174 #A up to 289564, 163.113 #X up to 754619, 163.136 #X as of 708319, 163.154 #X as of 708319 up to 754619, 163.172 #X as of 708319 with CODE (580) Air conditioning or Tempmatic for USA

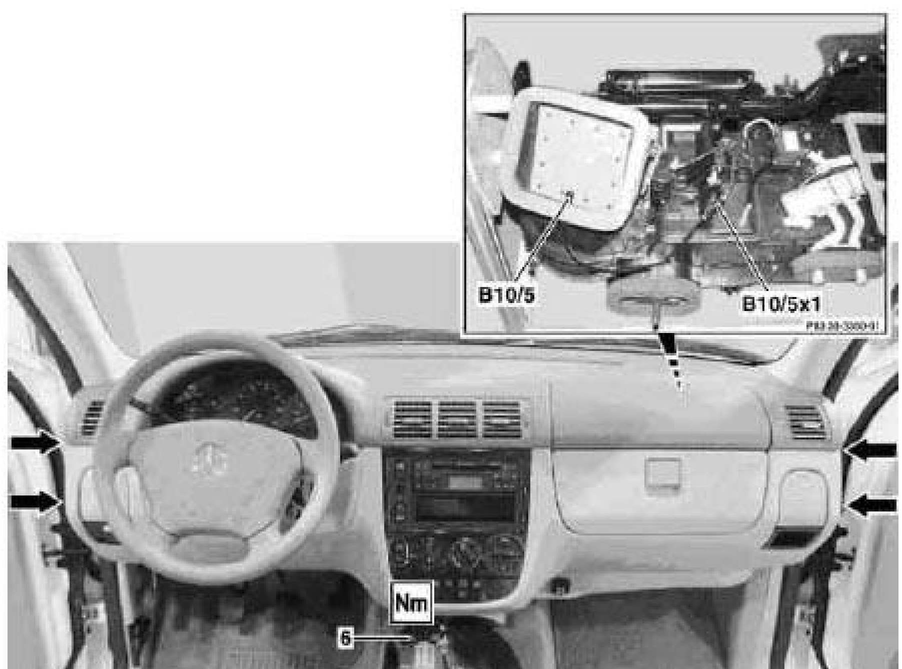
1	*Coolant compensating reservoir*
2	*Heat exchanger coolant delivery and return hoses*
3	*Nut*
4	*Expansion valve*
5	*Nuts*



P83.30-3419-06

Fig. 176: Identifying Coolant Compensating Reservoir

6	*Bolt*
B10/5	*Outside temperature sensor*
B10/5x1	*Outside temperature sensor connector*
Arrows	*screws for instrument panel to A-pillar*



P83.30-3420-06

Fig. 177: Identifying Outside Air Temperature Sensor And Connector

WF AD	**Remove/install**		
i	**Risk of injury** to skin and eyes suffering scalding from contact with hot coolant spray. **Risk of poisoning** from swallowing coolant.	Do not open cooling system unless coolant temperature is below 90°C. Open cap slowly and release the pressure. Do not pour coolant into beverage bottles. Wear protective gloves, protective clothing and eye protection.	**AS20.00-Z-0001-01A**
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Drain coolant	J Engine 112, 113. Engine 111. Engine 612.963.	**AR20.00-P-1142HA** AR20.00-P-1142HG AR20.00-P-1142M
2	Unscrew coolant compensating reservoir (1) on firewall	Lay compensating reservoir to one side.	
3	Disconnect coolant delivery/return hoses for heat exchanger (2)	Remove hose clamps from coolant hoses.	
4	Discharge air conditioning system	**Installation:** Evacuate air conditioning, refill and check for proper operation and leaktightness.	**AR83.30-P-1760GH**
5	Remove cover on expansion valve (4)		
6	Remove nut (3) on expansion valve (4)	Replace self-locking nut.	***BA83.30-P-1003-01B**
7	Disconnect refrigerant lines from expansion valve	**Installation:** Install new sealing rings and moisten with compressor oil.	

8	Remove wiper system		**AR82.30-P-6400GH**
9	Remove nuts (5) from instrument panel at firewall		***BA68.10-P-1001-01A**
10	Remove paneling from A-pillar		**AR68.30-P-4050GH**
11	Remove plastic nuts on driver's side at paneling below instrument panel		
12	Remove paneling on right in footwell		**AR68.30-P-4010GH**
13	Remove rubber covers on side at the A-pillars and unscrew screws for instrument panel at A-pillar (arrows)		***BA68.10-P-1002-01A**
14	Remove center console		**AR68.20-P-2000GH**
15	Unscrew bolt (6) underneath the instrument panel		***BA68.10-P-1003-01A**
16	Withdraw instrument panel to the rear	Bring in helper. Cushion front edge of selector lever module so that lower edge of instrument panel is not damaged.	
17	Turn instrument panel around so that the back is accessible	Do not overstretch interior wiring harness.	
18	Detach outside temperature sensor connector (B10/5x1)		
19	Disconnect cable from temperature sensor to evaporator housing	**Installation:** Ensure clean cable routing.	
20	Remove outside temperature sensor (B10/5) from air duct	2 bolts.	
21	Install in the reverse order		
22	Inspect cooling system for leaks		**AR20.00-P-1010HA**

Dashboard

Number	Designation		Model Series 163
BA68.10-P-1001-01A	Nut, dashboard to firewall	NM	8
BA68.10-P-1002-01A	Bolt, dashboard to A-pillar	NM	19
BA68.10-P-1003-01A	Bolt, dashboard to transmission tunnel	NM	30

Air conditioning system

Number	Designation		Model Series 163
BA83.30-P-1003-01B	Nut to pipeline on expansion valve	NM	10

REMOVE/INSTALL AIR OUTLET TEMPERATURE SENSOR - AR83.30-P-8087GH

MODEL 163.113 #A as of 289565, 163.154 #A as of 289620, 163.174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

Instrument panel center nozzles

B10/24 Center nozzle air stream temperature sensor



P83.30-3568-11

Fig. 178: Identifying Center Nozzle Air Stream Temperature Sensor

1.1	Remove glove compartment	Only required on left hand drive vehicles.	**AR68.10-P-1400GI**
1.2	Remove instrument cluster	Only required for right-hand steering.	**AR54.30-P-6015GH**
2	Remove center air nozzles		**AR68.10-P-1150GH**
3	Remove center nozzle air stream temperature sensor (B10/24)	Do not damage center nozzle air stream temperature sensor (B10/24) in order to avoid malfunctions. The center nozzle air stream temperature sensor (B10/24) is positioned on the right side above the air nozzles on the instrument panel. Turn the center nozzle air stream temperature sensors (B10/24) 90° counterclockwise.	
4	Disconnect center nozzle air stream temperature sensor plug (B10/24)		
5	Install in the reverse order		

REMOVE/INSTALL AIR OUTLET TEMPERATURE SENSOR - AR83.30-P-8087GI

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

Driver's side footwell

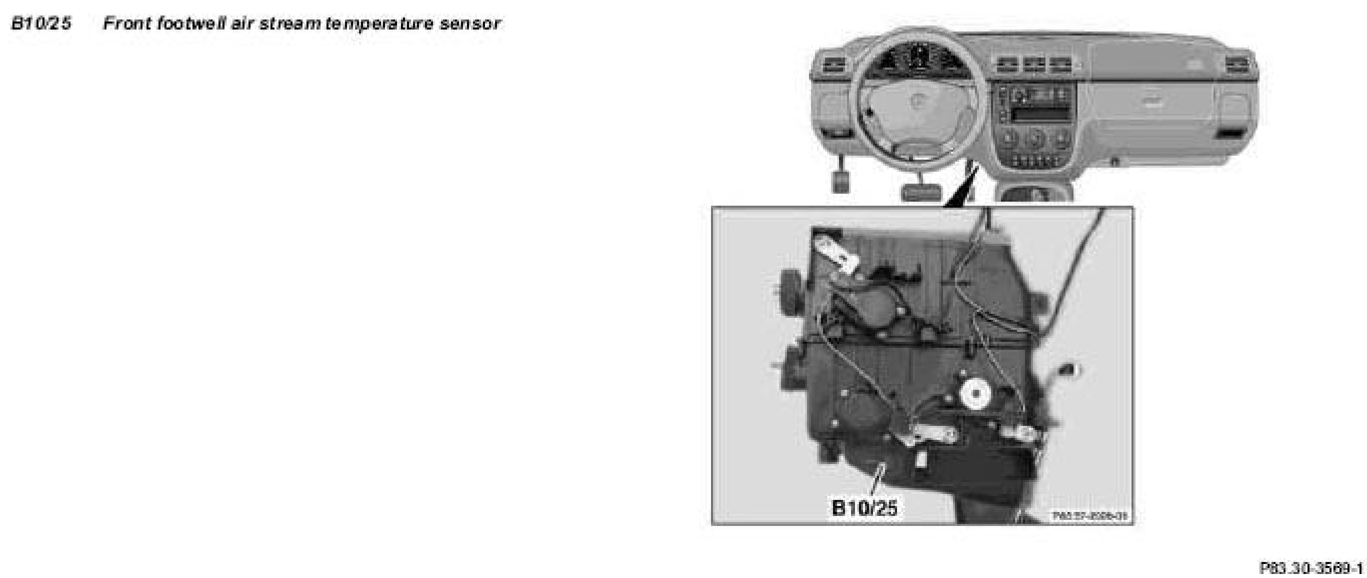


Fig. 179: Identifying Front Footwell Air Stream Temperature Sensor

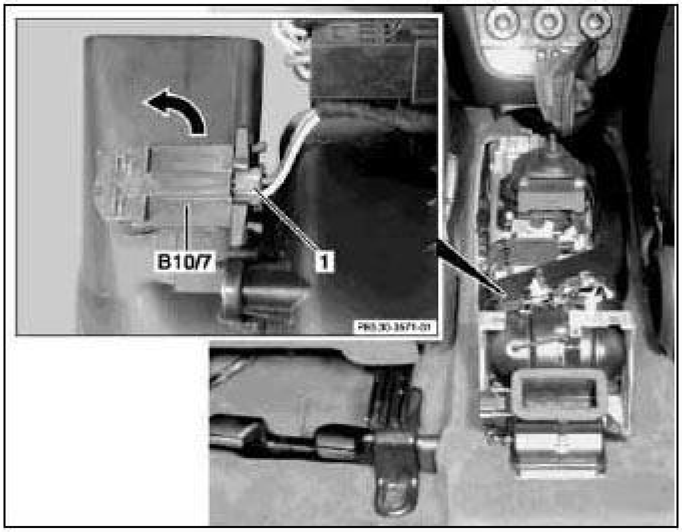
WF AD	**Remove/install**		
1	Remove cover below instrument panel		**AR68.10-P-1500GH**
2	Disconnect plug from front footwell air stream temperature sensor (B10/25)		
3	Remove front footwell air stream temperature sensor(B10/25)	Do not damage front footwell air stream temperature sensor (B10/25). Turn front footwell air stream temperature sensor (B10/25) 90 counterclockwise.	
4	Install in the reverse order		

REMOVE/INSTALL AIR OUTLET TEMPERATURE SENSOR - AR83.30-P-8087GJ

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

Blower motor in rear

1	Connector
B10/7	Rear air stream temperature sensor



P83.30-3570-11

Fig. 180: Identifying Rear Air Stream Temperature Sensor And Connector

WF AD	**Remove/install**		
1	Remove center console		**AR68.20-P-2000GH**
2	Remove sound deadener		
3	Disconnect plug (1) from rear air stream temperature sensor (B10/7)	The rear air stream temperature sensor (B10/7) is positioned in the left air nozzle on the blower motor.	
4	Remove rear air stream temperature sensor (B10/7)	Do not damage rear air stream temperature sensor (B10/7). Turn rear air stream temperature sensor (B10/7) 90 counterclockwise.	
5	Install in the reverse order		

REMOVE, INSTALL IN-CAR TEMPERATURE SENSOR FOR ASPIRATOR BLOWER (M9) - AR83.30-P-8100GH

MODELS 163.113/136/154/172/174 as of 1.9.99 up to 31.8.01

1	ETC control module bracket
2	Bolt
3	Hose
4	Bolts
5	Retaining clip
M9	In-car temperature sensor aspirator blower
X18	Interior and taillamp wiring harness connector

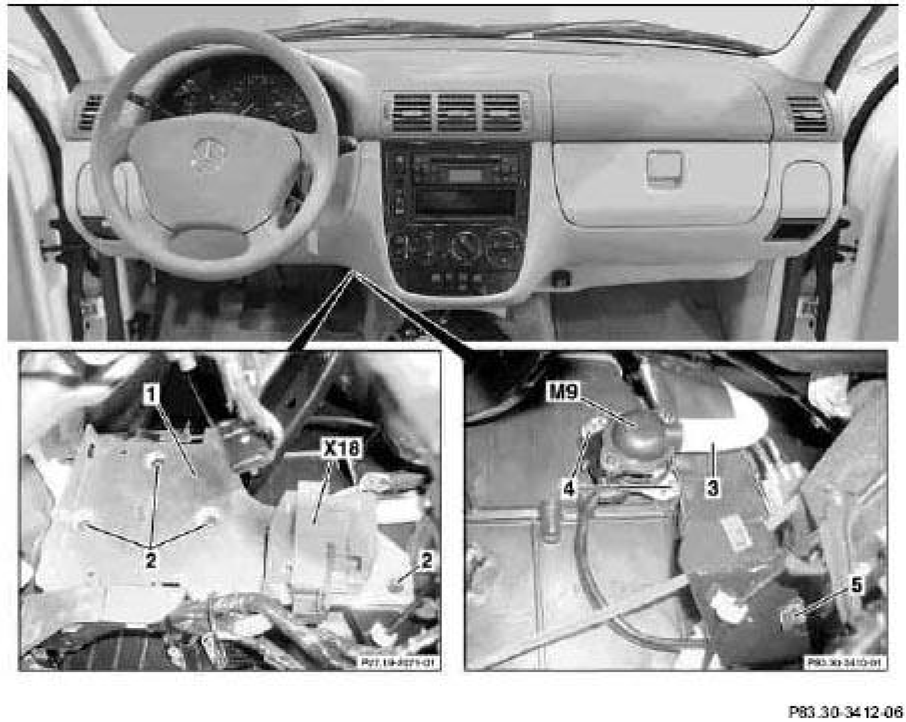


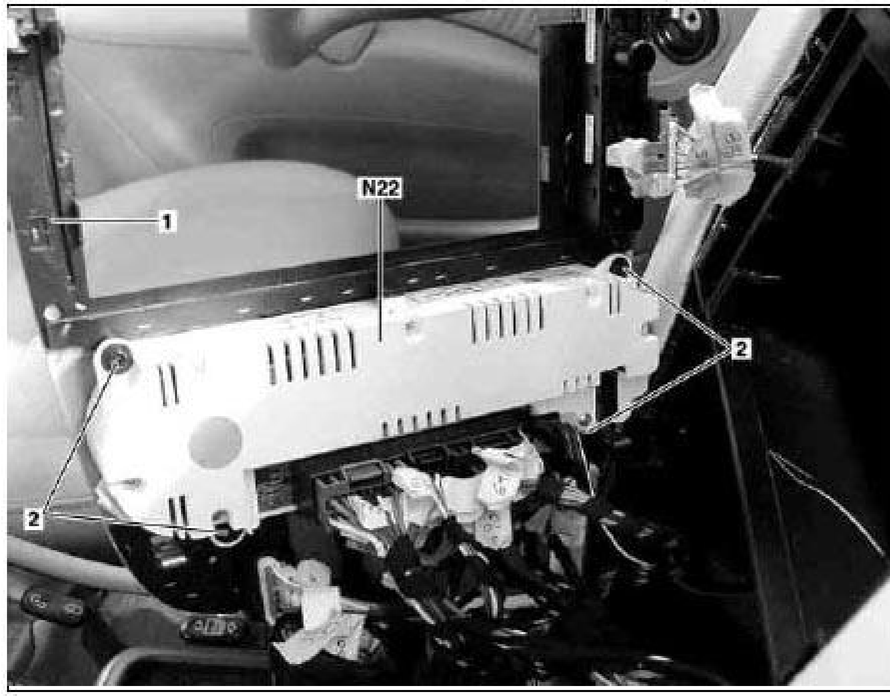
Fig. 181: Identifying Components Of In-Car Temperature Sensor For Aspirator Blower

WF AD	**Removal, installation**		
1	Remove ETC control module		**AR27.19-P-1719GH**
2	Detach connector for interior/rear lamp wiring harness (X18) at ETC bracket (1)	Release clamp on back of bracket and slide connector forward.	
3	Disconnect connector (X18)		
4	Unscrew bolts (2)		
5	Lay bracket (1) downward and to the side		
6	Detach hose (3) at aspirator blower (M9)		
7	Detach clip (5) of aspirator blower connector at instrument panel bracket		
8	Disconnect in-car temperature sensor aspirator blower's connector		
9	Unscrew bolts (4)		
10	Remove in-car temperature sensor aspirator blower (M9)		
11	Install in the reverse order		

REMOVE/INSTALL SWITCH UNIT/AUTOMATIC AIR CONDITIONING CONTROL MODULE - AR83.40-P-6500GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128/157/175

1	*Instrument panel center section*
2	*Bolts*
N22	*AAC pushbutton control module*



P83.40-2329-06

Fig. 182: Identifying AAC Push-button Control Module

WF AD	**Remove/install**		
1	Remove center section of instrument panel		**AR68.10-P-1030GH**
2	Remove switch unit of AAC control and operating module (N22) from center part of instrument panel (1)		
3	Unscrew screws (2) from AAC control and operating module (N22)		
4	Disconnect AAC control and operating module (N22) from center section of instrument panel	Loosen retaining clamps at the top and bottom.	
5	Install in the reverse order		

REMOVE AND INSTALL SUN SENSOR - AR83.40-P-6720GH

MODEL 163.113 /154 /174 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 with CODE (580) Air conditioning or Tempmatic for USA

1 Connector
B32 Sun sensor

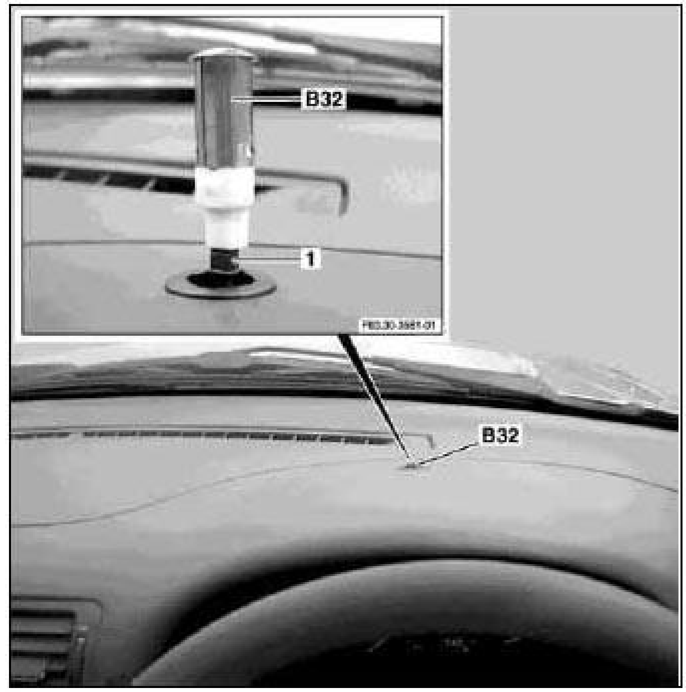


Fig. 183: Identifying Sun Sensor And Connector

WF AD	Remove/install		
1	Pull sun sensor (B32) upwards out of the instrument panel	Do not damage sun sensor and instrument panel. Installation wedge	Fig. 184
2	Disconnect plug (1) from sun sensor (B32)		
3	Install in the reverse order		

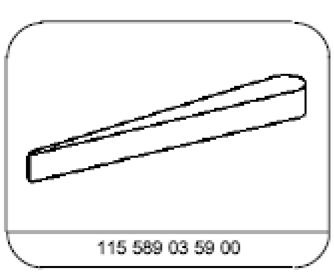


Fig. 184: Identifying Longitudinal Wedge (115 589 03 59 00)

REMOVE AND INSTALL REFRIGERANT COMPRESSOR - AR83.55-P-5300GH

ENGINE 112 in MODEL 163 with CODE (580) Air conditioning or Tempmatic for USA

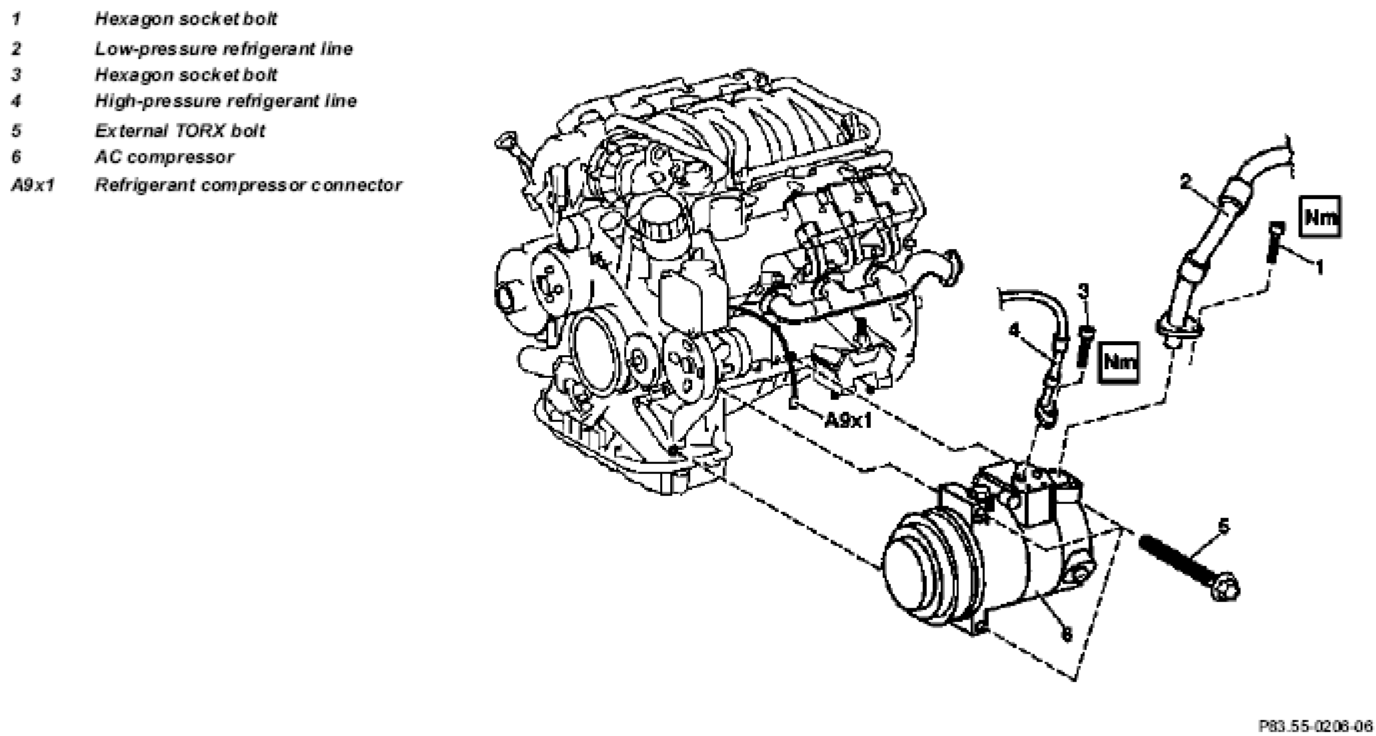


Fig. 185: Identifying Refrigerant Compressor Components

WF AD	**Remove/install**		
i	**Risk of explosion** from welding or soldering work on closed air conditioning system. **Risk of poisoning.** Inhaling overheated refrigerant vapors may be toxic. **Risk of injury** from skin and eye contact with liquid refrigerant.	Do not carry out any welding work on the closed air conditioning system or in the surrounding area. No smoking or open flames. Wear eye protection and protective gloves. Work only in well ventilated areas. Carry out repair work on the air conditioning system circuit only after the system has been discharged.	**AS83.00-Z-0001-01A**
	Procedures if air conditioning system is damaged or leaking	All models	**AH83.30-N-0004-01A**
	Protect air conditioning circuit and components from moisture when carrying out repair work	All models fitted with air conditioning	**AH83.30-N-0005-01A**
	Notes on handling refrigerant R134a	All models fitted with air conditioning	**AH83.30-N-0003-01A**
1	Discharge air conditioning system	**Installation:** Evacuate air conditioning, refill and check for proper operation and leaktightness.	**AR83.30-P-1760GH**

2	Remove poly V-belt		**AR13.22-P-1202B**
3	Unscrew hexagon socket head screw (1) securing low-pressure refrigerant line (2) to refrigerant compressor (6)	Detach low-pressure refrigerant line (2) from refrigerant compressor (6). **Installation:** Install new sealing rings and moisten with compressor oil.	
			***BA83.55-P-1002-01A**
4	Unscrew hexagon socket head screw (3) securing high-pressure refrigerant line (4) to refrigerant compressor (6)		***BA83.55-P-1002-01A**
5	Detach refrigerant compressor connector (A9x1) at refrigerant compressor (6)	**Installation:** Install new sealing rings and moisten with compressor oil.	
6	Unscrew external Torx drive bolt (5) from refrigerant compressor (6) at crankcase	External torx set	**Fig. 172**
7	Remove refrigerant compressor (6) from below	**Installation:** Note additional oil filling capacity when replacing the fluid reservoir.	***BF83.55-P-1005-01A**
8	Install in the reverse order		
9	Remove receiver/drier	The fluid reservoir must be replaced every time after the refrigerant compressor is removed and installed. **Installation:** Note additional oil filling capacity when replacing the refrigerant compressor.	**AR83.30-P-6520GH** ***BF83.55-P-1008-01A**

AC compressor

Number	Designation		Engines 111.977,112.942, 112.970,113.942/ 965/981 in MODEL 163
BA83.55-P-1002-01A	Bolt of refrigerant lines to AC compressor	NM	20

Refrigerant compressor

Number	Designation			Refrigerant compressor 7SB16, refrigerant R134a in model 163
BF83.55-P-1005-01A	Additional oil filling capacity when replacing fluid reservoir	Compressor oil	cm^3	10
		Specifications for Operating Fluids	Sheet	BB00.40-P-0362-00A

BF83.55-P-1008-01A	Additional oil filling capacity when replacing refrigerant compressor	Compressor oil	cm^3	20
		Specifications for Operating Fluids	Sheet	BB00.40-P-0362-00A

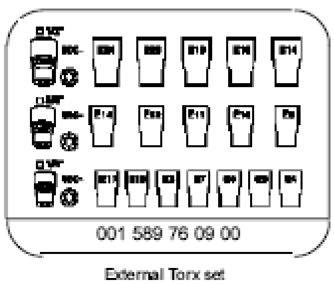


Fig. 186: Identifying External Torx Set (001 589 76 09 00)

MAINTENANCE

REPLACE DUST FILTER FOR HEATING/AIR CONDITIONING - AP83.00-P-8381GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

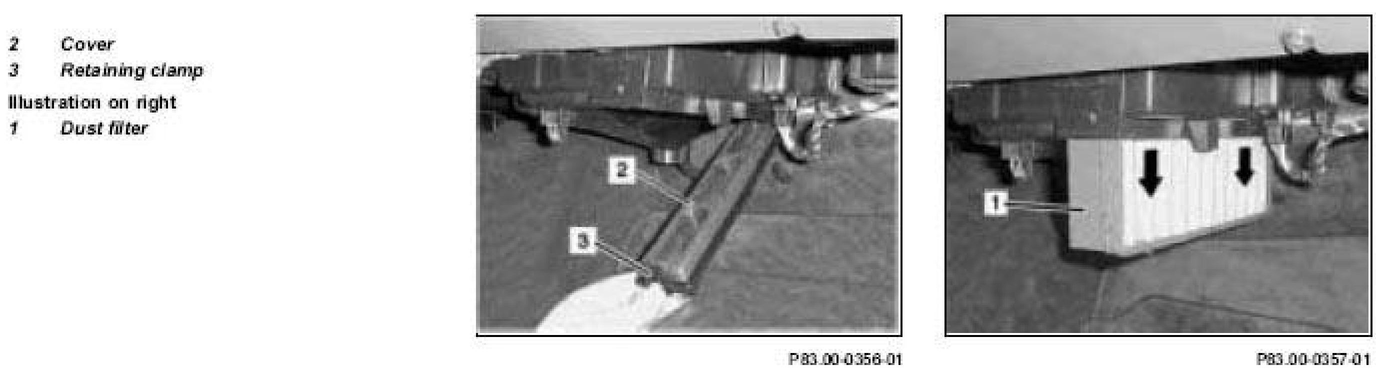


Fig. 187: Identifying Dust Filter

WF AD	**Remove/install**		
1	Remove cover below instrument panel (passenger side)	Up to 31.08.99	**AR68.10-P-1520GH**
BT	Remove/install cover below instrument panel (right)	As of 01.09.99	**AR68.10-P-1520GI**
2	First unlatch retaining clamp (3), then remove cover(2)		
3	Withdraw dust filter (1) downwards (arrows)	The dust filter must not be cleaned; it must be replaced.	
4	Install in the reverse order		

REMOVAL & INSTALLATION

INSTALL AUXILIARY WIRING HARNESS - SM83.30-P-0009GH

MODEL 163.154 #A up to 289564, 163.154 #X, 163.136 /172 with CODE (580) Air conditioning (or Tempmatic for USA)

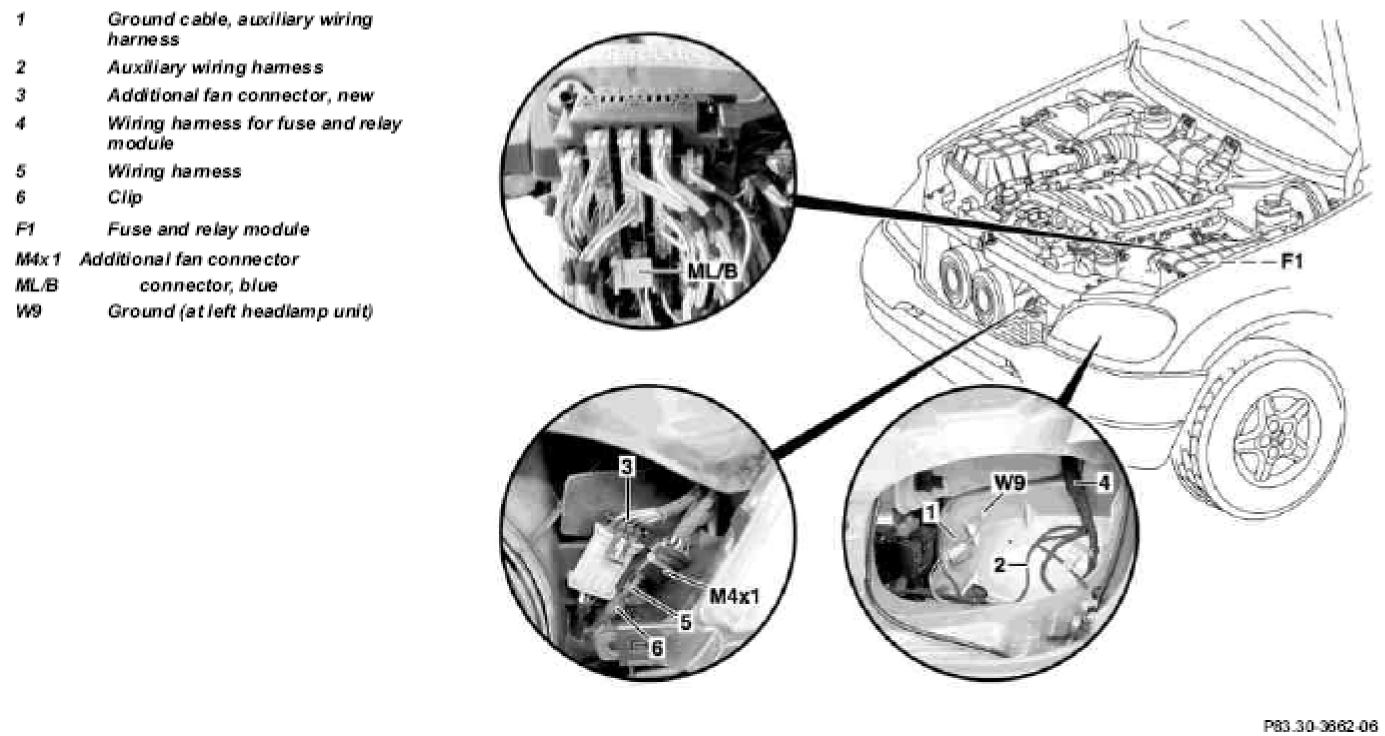


Fig. 188: Identifying Auxiliary Wiring Harness Location

Operation no. of operation texts or standard texts and flat rates

Category	Op. no.	Operation text	Time	Acc. no.	Code
P	023731	INSTALLING MODIFIED WIRING HARNESS FOR Additional fan (AFTER CHECKING)	015WU/1.3h	-	-

WF	**Removing**		
1	Disconnect battery ground cable		**AR54.10-P-0003A** ***BA54.10-P-1017-01C**
2	Remove rear cover from fuse and relay module (F1)	5 screws.	
3	Remove mounting screws of fuse holder on fuse and relay module (F1) and lay down to		

	side		
4	Disconnect blue connector (ML/B) from bottom of fuse holder		
5	Remove lamp unit		**AR82.10-P-4730GH**
6	**Remove original** additional fan connector (M4x1) from additional fan and fasten to present wiring harness (5) with adhesive tape on clip (6)		
WF	**Install**		
7	Route new additional fan connector (3) on **auxiliary** wiring harness (2) to additional fan connector and insert	Route along original wiring harness at rear of installation opening of lamp unit	
8	Fasten auxiliary wiring harness (2) to original wiring harness in area of clips with cable straps.		
9	Fasten auxiliary wiring harness ground cable (1) to left front ground (W9)		***BA54.10-P-1017-01C**
10	Route auxiliary wiring harness (2) into fuse and relay module	Route fuse and relay module along wiring harness for fuse and relay module (4) below installation opening of lamp unit between washer water reservoir and fender to grommet on **left** side of fuse and relay module. Remove adhesive tape from rubber grommet, thread wiring harness through and reinstall adhesive tape.	
11	Route connection terminal of auxiliary wiring harness (2) to blue connector (ML/B) at bottom of fuse holder		
12	Open housing of connector (ML/B) and remove lead from plug location 1		
13	**Separate present** lead approx. 100 mm in front connection terminal		
	Insert connection terminal for **auxiliary** wiring harness	Ensure that connection terminal arrests correctly	

14	(2) into plug location 1 of connector (ML/B) and close connector housing.	in connector.	
15	Insert blue connector (ML/B) at bottom of fuse holder and fasten auxiliary wiring harness (2) to separated lead with adhesive tape	Ensure that stripped wire ends are insulated with adhesive tape.	
16	Fasten fuse holder to fuse and relay module with screws		
17	**Insert new** 40 A fuse at position f44 in fuse holder	The larger line diameter of the auxiliary wiring harness (2) allows installation of a 40 A fuse.	
18	Install in the reverse order		
19	Check function of additional fan		

Battery

Number	**Designation**		**Model 163**
BA54.10-P-1017-01C	Nut, ground cable to body	Nm	18

Parts ordering notes

Part no.	**Designation**	**Quantity**
163 540 00 35	Auxiliary wiring harness	1
910153 000000	Fuse, 40 A	1